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United States Naval Institute Proceedings

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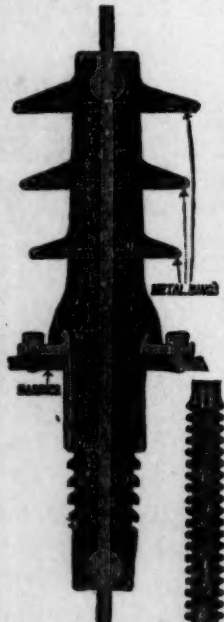

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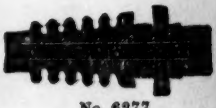

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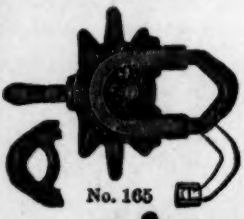

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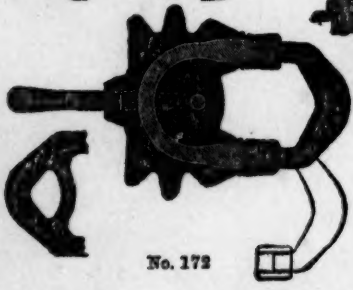

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THE MEDAL OF HONOR
U. S. NAVY, 1919

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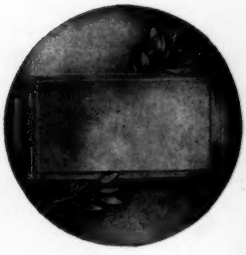

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WAR DECORATIONS

By COLONEL DION WILLIAMS, U. S. Marine Corps

A decoration in the sense here used is a badge or mark of honor to be worn upon the person as a reward for eminent or conspicuous service in battle or for honorable participation in a particular battle or campaign. Such decorations are usually bestowed by order of the sovereign or chief executive of a nation or by enactment of the parliamentary or congressional body. In many countries decorations are also bestowed for conspicuous services to the state in peace time as well as for notable achievements in the fields of art and literature. They include medals, crosses, campaign badges and ribbons and the stars and ribbons that constitute the insignia of the orders of knighthood.

War decorations may be primarily divided into several classes: the insignia of the orders of knighthood conferred for service in war, war crosses, special service medals, general service medals, long service medals, good conduct medals and badges, and medals or badges awarded for excellence in target shooting. The first class is unknown in the army and navy of the United States of America, since clause 8 of section 9 of Article I of the Constitution provides that "no title of nobility shall be granted by the United States: and no person holding any office of profit or trust under them, shall, without the consent of the Congress,

accept of any present, emolument, office, or title, of any kind whatever, from any king, prince, or foreign state."

War crosses are decorations made in the form of a cross and awarded for eminent or conspicuous service in war; special service medals are those awarded to persons by name for individual acts of gallantry or devotion to duty; general service medals are those conferred to all of the participants in a war or a particular campaign; long service medals and badges and good conduct medals and badges are issued to enlisted men for long and faithful service or for good conduct and attention to duty throughout the term of an enlistment; and those for excellence in target shooting are awarded for high percentages attained in the prescribed courses of rifle or pistol target practice.

With but very few exceptions, military medals are worn with the uniforms for which they are prescribed on the left breast of the coat between the center line and the point of the left shoulder, the medals being suspended from a holding bar by means of a ribbon of distinctive color or colors. The medals themselves are worn only with full dress uniforms, or with other uniforms when it is desired to do special honor to the occasion. With service and field uniforms, small sections of the distinctive ribbons are worn in lieu of the medals and in the same position on the coat. The exceptions referred to are noted in the descriptions of the different medals.

Where two or more decorations, medals or badges have been awarded to a person they are worn side by side suspended from one holding bar and if there are so many that they cannot be so worn in the space between the center line of the coat and the point of the shoulder the ribbons and medals are still attached to a single holding bar and overlapped so as to go in the allotted space.

The order in which the various decorations shall be arranged is prescribed in the official regulations of the army and navy. The position of honor is at the center or at the right end of the holding bar and the medals are usually arranged according to the dates of the events for which they were awarded.

The sections of the distinctive ribbons of decorations worn with service and field uniforms are arranged upon a holding bar in the same order as that prescribed for the medals, but they are never overlapped. In case there are so many ribbons that a single

bar will not accommodate them an additional bar is used, to be worn below the first bar and parallel to it.

Button rosettes made of silk of the colors of the distinctive ribbons are authorized for wear in the left lapel of the civilian coat, but only one such rosette should be worn at a time.

It is interesting to trace the origin and development of these decorations which have come to form such an important part of the uniforms of soldiers and sailors throughout the world, and which are very highly prized by the recipients as the outward and visible sign of the faithful service or of the deeds of gallantry which they commemorate.

Medals are pieces of metal struck from dies after the manner of coins for the purpose of commemorating some historical event or as rewards for service to the state in peace or war. They usually bear a design appropriate to the occasion which they commemorate, combined with inscriptions and dates of an explanatory nature or mottoes applicable to the particular deed or event.

The Greeks and Romans used medals as rewards or prizes in athletic contests and also to commemorate notable events, such as the accession of a sovereign or a great victory in war; but there is nothing extant to show that these medals were intended to be worn as a part of the uniform or dress of individuals.

The first use of medals as military decorations of which any historical record is found was by the Chinese about 60 A. D., when the Emperor Liu Siu of the Han dynasty caused medals to be made and issued to certain of his military commanders as rewards for valorous acts in battle. These medals were probably worn suspended from a cord or ribbon around the neck, as they were pierced near the upper edge, and old pictures show warriors wearing something of this nature.

It was not until many centuries later, however, that the custom of wearing medals as personal decorations became the fashion in the western world. During the reign of Henry VIII of England, 1509-1547, medals were worn as decorations by members of the nobility, but there is nothing to show that any of them were conferred by the state or sovereign as strictly military rewards for valiant service. The first medal so issued of which there is any authentic record was the so-called "Ark and Flood" medal conferred by Queen Elizabeth in 1588 as a reward for war service in the English Navy and Army. This is a silver medal bear-

ing on the obverse the effigy of the queen surrounded by the inscription, "Elizabeth D. G. Angliae F. ET HI. REG.," and on the reverse a scene representing the ark floating on the waves in the rays of the sun, surrounded by the words, "SAEVAS TRANQUILLA PER VINDAS."

A little later, in 1630, Gustavus Adolphus, "The Whirlwind of the North," conferred a military medal upon certain of his officers and men of the victorious Army of Sweden which, guided by his superb military genius, swept over Europe and founded a new school of military tactics. Other nations of Europe followed the custom of conferring medals for war service until it became universal.

In many of these medals the effigy of the sovereign was used as the principal motif for the design shown on the obverse and we find this custom still prevailing even in republics, as evidenced by the head of Lincoln upon the U. S. Army Civil War medals.

During the 330 years since the issue of the "Ark and Flood" medal by Queen Elizabeth the British Government has conferred upon her soldiers and sailors some 200 decorations to commemorate victories on sea and land or as rewards for individual acts of heroism in battle in her many wars, great and small. Following this lead other nations have conferred many such decorations, but none carried the custom to so great an extent as Great Britain.

The first medal conferred by the government of the United States was authorized by a resolution of Congress on March 25, 1776, when the news reached the seat of government at Philadelphia that the British had evacuated Boston on March 17, 1776. The resolution provided that the thanks of Congress be presented to General George Washington, commander-in-chief of the Continental Army, with a gold medal to commemorate the event. The obverse of the medal bore the effigy of Washington surrounded by the inscription, in Latin, "The American Congress to George Washington, the Commander-in-Chief of the Army and the Assertor of Freedom," and the reverse bore a design depicting the British troops embarking in their ships and the American troops entering the town from the landward side, surrounded by the legend, "The enemy for the first time put to flight."

The next medal authorized by Congress was a gold one, presented to Captain John Paul Jones with the thanks of Congress

after the great sea fighter in the U. S. S. *Bonhomme Richard* had fought his famous battle with H. M. S. *Serapis,* September 23, 1779, as a result of which the *Bonhomme Richard* sank and the victorious American captain and his crew transferred to the *Serapis* and took her into a French port. It was during this battle that the British captain, Pearson, of the *Serapis* with his ship lying alongside of the *Bonhomme Richard,* noting that the latter ship was on fire and that her gunfire had greatly diminished, called upon the American ship to surrender. With characteristic courage and tenacity Captain John Paul Jones shouted back, "I have not yet begun to fight!" This reply encouraged the crew of the *Richard* to redouble their efforts and resulted in victory for them even with the loss of their own ship.

Thus was born one of the three rallying cries of the American Navy, the other two being the words of Captain Lawrence of the U. S. S. *Chesapeake,* who during the battle with H. M. S. *Shannon* on June 1, 1813, was mortally wounded and while being carried below decks cried out to his men, "Don't give up the ship!" and the order of Admiral Farragut at the Battle of Mobile, August 5, 1864, "Damn the torpedoes, go ahead!" given when the captain of his flagship, the *Hartford,* had reported to him that a torpedo had exploded in the channel ahead of the fleet.

During the War of 1812 a number of gold medals were struck in accordance with acts or resolutions of Congress, to be presented to the commanders of the American ships in the naval victories that marked the few bright spots in the history of that war. Among the victors so rewarded and the battles commemorated were Commodore Perry, Battle of Lake Erie, September 10, 1813; Captain James Lawrence, U. S. S. *Hornet* and H. M. S. *Peacock,* resulting in the capture of the latter ship, February 24, 1813; Captain Lewis Warrington, U. S. S. *Peacock* and H. M. S. *Epervier,* April 20, 1814, this being the same *Peacock* captured from the British, the battle resulting in the capture of the *Epervier;* Captain Thomas McDonough, commanding the American squadron at the Battle of Lake Champlain, September 11, 1814; Captain Jacob Jones, U. S. S. *Wasp* and H. M. S. *Frolic,* October 12, 1812; Captain Stephen Decatur, U. S. S. *United States* and H. M. S. *Macedonian,* October 25, 1812; and Captain Blakely, U. S. S. *Wasp* and H. M. S. *Reindeer,* June 28, 1814.

It is interesting to note that the name of each of these great American naval victors is now borne by a destroyer of the United States Navy engaged in the present war and that their victories of over a century ago still live in the hearts of the gallant young Americans aboard these little warships that are maintaining the "Freedom of the Seas" against the deadly menace of the Hun U-boat.

After General Grant had won the Battle of Chattanooga, November 23, 24, 25, 1863, a gold medal with the thanks of Congress was presented to him in commemoration of the great victory, regarded by many students of military strategy as the turning point of the Civil War.

None of these medals were designed as decorations, however; that is, they were not intended to be worn upon the person of the recipient, but were more in the nature of tokens commemorating the victories for which the higher honor, the "thanks of Congress," was extended.

The first medal authorized by the government of the United States to be worn upon the person as a war decoration was the naval medal of honor, provided for in the act of Congress of December 21, 1861, to be "bestowed upon such petty officers, seamen, landsmen and marines as shall most distinguish themselves by their gallantry in action and other seamanlike qualities during the present war." The terms of the law did not permit of the bestowal of this medal upon commissioned or warrant officers, but limited the reward to enlisted men. One thousand dollars was appropriated in the act for the purchase of 200 of these medals of honor.

This medal was struck from bronze metal taken from captured cannon. In form it is a five-pointed star with a circular central medallion, the points of the star being of trefoil shape. On the central medallion is a design representing Minerva standing with her left hand resting upon a *fasces* and with a shield in her right hand warding off the figure of Discord, the design being surrounded by a circle of 34 stars, one for each state of the Union as it existed in 1861. The rays of the star are decorated with oak and laurel leaves. The medal is suspended by means of a bronze anchor from a clasp made up of bound *fasces,* having a single five-pointed star at the center; this clasp being suspended in turn by a ribbon from a similar clasp at the upper end for attachment

to the coat, the upper clasp having no star. The ribbon worn with this original medal had 13 vertical stripes of alternate red and white with a band of blue across the top.

This was followed on July 12, 1862, by a resolution of Congress authorizing the President "to cause two thousand medals of honor to be prepared with suitable emblematic devices, and to direct that the same be presented, in the name of Congress, to such non-commissioned officers and privates as shall most distinguish themselves by their gallantry in action, and other soldier-like qualities, during the present insurrection." The medal adopted for this purpose was the same as that above described for the navy medal of honor and the same distinctive ribbon was used at first, but the suspending clasps were of different design. The lower clasp consisted of a trophy of arms, two cannon crossed, a sword, and cannon balls, all surmounted by an eagle with wings lifted; and the upper clasp bore a design of a shield of the United States with a cornucopia on either side.

The reverse side of both the naval and military medals of honor is plain, with the name, rank and regiment or ship of the recipient and the place and date of the act for which the award was made.

The act of Congress of July 16, 1862, contained a proviso reading as follows: "Seamen distinguishing themselves in battle, or by extraordinary heroism in the line of their profession, may be promoted to forward warrant officers, or acting masters' mates, as they may be best qualified, upon the recommendation of their commanding officer, approved by the flag-officer and the department. Upon such promotion they shall receive a gratuity of one hundred dollars and medal of honor to be prepared by the Navy Department."

Thus we see that for both the naval and the military services the award of the medal of honor was still confined to enlisted men. For the army this was changed by the act of Congress of March 3, 1863, which empowered the President to award the medal of honor to officers as well as to enlisted men, the act reading as follows: "And be it further enacted, That the President cause to be struck from the dies recently prepared at the United States mint for that purpose, 'Medals of Honor' additional to those authorized by the act (resolution) of July twelfth, eighteen hundred and sixty-two, and present the same to such officers, non-

commissioned officers and privates as have most distinguished or who may hereafter most distinguish themselves in action."

It will be noted that while the former laws on the subject authorized the award of the medal for acts performed in action during the Civil War, the act of July 16, 1862, provided for the award at any future time to enlisted men of the navy, and that the act of March 3, 1863, made a like provision for the award of the medal to officers and enlisted men of the army.

The acts of Congress referred to as applying to the naval service were embodied in section 1407 of the Revised Statutes, and in 1900 this statute was construed to mean that only enlisted men holding the specific rating, or rank, of "seaman" in the navy were eligible to receive the medal of honor. In order to effectuate the real intent of the original lawmakers, an act was passed by Congress and approved on March 3, 1901, providing, "That any enlisted man of the navy or marine corps who shall have distinguished himself in battle or displayed extraordinary heroism in the line of his profession shall, upon the recommendation of his commanding officer, approved by the flag-officer and the Secretary of the Navy, receive a gratuity and medal of honor as provided for seamen in section fourteen hundred and seven of the Revised Statutes."

Although the law of March 3, 1863, authorized the award of the medal of honor to officers of the army as well as to enlisted men, it was not until March 3, 1915, that authority was given the President to award it to officers of the navy and marine corps, that law reading as follows: "The President of the United States is hereby empowered to prepare a suitable medal of honor to be awarded to any officer of the navy, marine corps, or coast guard who shall have distinguished himself in battle or displayed extraordinary heroism in the line of his profession."

An act of Congress approved May 4, 1898, authorized the Secretary of the Navy to issue to any person in the naval service to whom a medal of honor has been awarded or may hereafter be awarded a rosette or knot to be worn in lieu of the medal and a ribbon to be worn with the medal. This resulted at first in the issue of a knot of red, white and blue ribbon to be worn by holders of the medal of honor when wearing civilian clothes, and later in the issue of a red, white and blue rosette button for the same purpose.

MEDAL OF HONOR
U. S. NAVY

MEDAL OF HONOR
U. S. ARMY

MANILA BAY MEDAL

MEDAL FOR NAVAL ENGAGEMENTS IN WEST INDIES, 1898

CONGRESSIONAL MEDALS

DISTINGUISHED SERVICE CROSS U. S. ARMY 1918

CONGRESSIONAL MEDAL
FOR PHILIPPINE SERVICE
U. S. ARMY, 1899

CERTIFICATE OF
MERIT MEDAL, U. S. ARMY

In 1876 the original ribbon worn with the army medal of honor, consisting of the 13 alternate vertical red and white stripes with the upper transverse band of blue, was replaced by a ribbon having a narrow stripe of white through the center with a narrow stripe of blue on either side and a wider stripe of red at each edge. The ribbon was arranged to be worn around the neck with the clasps and the medal suspended from it at the front and center.

The act of Congress of April 23, 1904, appropriating the necessary moneys for the maintenance of the military establishment, provided for "three thousand medals of honor to be prepared, with suitable emblematic devices, upon the design of the medal of honor heretofore issued, or upon an improved design, together with appropriate rosettes and other insignia to be worn in lieu of the medal, and to be presented by direction of the President, and in the name of Congress, to such officers, non-commissioned officers and privates as have most distinguished, or may hereafter most distinguish, themselves by their gallantry in action."

Accordingly, the design of the army medal of honor was changed and a different ribbon prescribed. This ribbon is of light blue silk with 13 white stars at the center and is worn around the neck with the medal suspended from it at the front and center of the coat collar opening.

The new design retains the general five-pointed star shape of the old one with the central circular medallion, but it is made of silver heavily gold-plated and the star is superimposed upon a wreath of laurel in green enamel, while each ray of the star bears an oak leaf in green enamel. The star is suspended by means of two gold links from a bar which is surmounted by an eagle and ring for attaching the medal to the neck ribbon. The word "VALOR" appears in raised letters upon the bar. The central medallion bears the head of Minerva, the goddess of war, surrounded by the inscription, "United States of America." The reverse of the medal is plain, with the name, rank and regiment of the recipient and the place and date of the act for which it is awarded engraved thereon, preceded by the words, "The Congress to."

As considerable confusion arose from the fact that the army had one design of ribbon and the navy another, the joint board of the army and navy made a recommendation that the two ser-

vices use the same ribbon. This recommendation was approved by the President on March 1, 1913, and since that date the navy medal of honor has been worn suspended from a light blue ribbon with 13 white stars at the center, the ribbon being worn around the neck, thus making the ribbons identical for all services.

The rosette now authorized to be worn with civilian dress by holders of the medal of honor, whether in the army, navy or marine corps, is hexagonal in shape and is made of light blue ribbon studded with silver stars.

In the case of officers of the army who have been awarded the medal of honor the letters " M. H." are printed after their names in the official annual " Army Register." The same rule is followed in the annual " Navy Register " in the case of officers of the marine corps who have been awarded the medal of honor, but for some unexplained reason officers of the navy holding the medal are not so honored.

A summing up of the various laws relating to the award of the medal of honor leads to the conclusion that the medal is granted to officers and enlisted men of the army for distinguished service in action only, while the medal may be awarded to an officer or enlisted man of the navy or marine corps for distinguished service in battle or for extraordinary heroism in the line of his profession, the latter case being applicable either in war or peace time.

Since the first authorization of medals of honor some 2100 have been awarded to officers and enlisted men of the army and 750 to officers and enlisted men of the navy and marine corps. As it is the highest reward of the kind awarded by our government, especial efforts have been made to preserve its value as a decoration and as an incentive to personal devotion to the country and the flag by awarding it only for those acts of gallantry and extraordinary courage which stand out over and above the bravery and conscientious attention to the performance of duty which is expected and exacted of everyone who wears the uniform of the United States.

The stories of these deeds which have been rewarded by the medal of honor would fill a large volume and make fine reading for those who appreciate unfaltering courage, good judgment, quick action and unhesitating response to the call of honor and duty.

Announcements of the award of the medal and a brief statement of the reasons therefore are made to the services in the form of General Orders from the War Department or the Navy Department, depending upon whether the officer or enlisted man so cited is in the army or in the naval service.

A few examples taken from the records of the departments will serve to show the varied nature of the acts of personal bravery and conspicuous gallantry which stand out so clearly above others as to be deemed worthy of the highest reward. Without exception these acts have been of a nature not required or demanded by any specific regulation or order, but which were dictated solely by the personal call of duty—to aid a wounded comrade, to rescue the drowning, or with quick perception to perform some signal act of bravery which might lead to victory or save a well-nigh lost cause—without regard to personal life or safety.

In many cases where a gallant act of personal bravery has resulted in the death of the officer or enlisted man performing the act no medal of honor has been awarded, but the effort is not lost, the incentive is left to the living comrades, who can sadly but proudly say, "Greater love hath no man than this, that a man lay down his life for his friends."

The records of the War Department give in concise official language the accounts of the deeds for which the medal of honor has been awarded to officers and enlisted men of the U. S. Army. From these brief accounts it is not difficult to form a mental picture of the bullet-swept and shell-torn fields of battle of the Civil War, in the Indian campaigns on the lonely western plains, in the tropical islands of the Philippines, or along the muddy banks of the Pei-Ho in far-off China.

In each of the following instances, taken from these records, the medal of honor was awarded:

Private James Kephart, 13th U. S. Infantry, for most distinguished gallantry in action at Vicksburg, Mississippi, May 19, 1863, in voluntarily and at the risk of his life, under the severe fire of the enemy, aiding and assisting to the rear an officer who had been severely wounded and left upon the field of battle.

Second Lieutenant R. G. Carter, 4th U. S. Cavalry, for most distinguished gallantry in action with the Indians on the Brazos River, Texas, October 10, 1871, in holding the left of the line with a few men during the charge of a large body of Indians

after the right of the line had retreated, and, by delivering a very rapid fire, checking the enemy until reenforcements could come to the rescue.

Acting Assistant Surgeon J. O. Skinner, U. S. Army, for rescuing a wounded soldier who lay under a close and heavy fire during the assault on the Modoc Indian stronghold in the Lava Beds, Oregon, January 17, 1873, after two soldiers had unsuccessfully attempted to make the rescue and both had been wounded in doing so.

Hospital Steward W. C. Bryan, U. S. Army, for distinguished gallantry in action on the Powder River, Wyoming Territory, on March 17, 1876. He voluntarily accompanied a detachment of cavalry which was ordered to charge a village of hostile Indians and after his horse was shot and killed under him, continued to fight on foot, and, in addition, under severe fire from the Indians, he carried two wounded men to places of safety, thus preventing them from being captured by the enemy.

Captain W. E. Birkhimer, 3d U. S. Artillery, for most distinguished gallantry in action. With but 12 of his command he charged 300 of the Philippine insurrectionists at San Miguel de Mayumo, island of Luzon, on May 13, 1899, and surprised and completely routed the enemy.

Private Joseph L. Epps, 33d Infantry, U. S. Volunteers, for extraordinary gallantry in action at the defence of Vigan, Luzon, Philippine Islands, December 4, 1899. A small force of Americans garrisoning the town of Vigan were attacked during the night by a large force of the enemy and after a gallant fight in the dark the enemy was routed, but with considerable loss to the defenders. Private Epps discovered a party of insurgents within a walled enclosure and climbing to the top of the wall covered them with his gun and forced them to surrender.

Colonel Frederick Funston, 20th Kansas Volunteer Infantry, for most distinguished gallantry in action at Rio Grande de la Pampanga, Luzon, Philippine Islands, on April 27, 1899, during the Philippine insurrection. He crossed the river on a raft under fire, and by his skill and daring made it possible for the commanding general to carry the enemy's entrenched position on the north bank of the river and drive him from the important strategic position at Calumpit.

CIVIL WAR

WEST INDIES CAMPAIGN

SPANISH CAMPAIGN

PHILIPPINE CAMPAIGN

U. S. NAVY CAMPAIGN BADGES

CIVIL WAR

INDIAN WARS

CUBAN OCCUPATION

MEXICAN CAMPAIGN

U. S. ARMY CAMPAIGN BADGES

Private Louis Gedeon, 19th U. S. Infantry, for most distinguished gallantry in action at Mount Amia, Cebu, Philippine Islands, February 4, 1900. His captain fell mortally wounded, and Gedeon, single-handed and alone, defended him against the vicious attacks of an overwhelming force of the enemy until assistance arrived.

Captain Louis B. Lawton, 9th U. S. Infantry, for most distinguished gallantry in the battle of Tientsin, China, during the Boxer Rebellion, July 13, 1900. Although wounded three separate times in doing so he carried messages and guided reenforcements across a wide and fire-swept field.

Sergeant Alexander M. Quinn, 13th U. S. Infantry, and Sergeant Andrew J. Cummins and Privates Alfred Poland, James J. Nash, Charles P. Cantrell and William Keller, 10th U. S. Infantry, for distinguished bravery in the battle of Santiago, Cuba, July 1, 1898, in rescuing wounded men from in front of the lines under heavy fire from the enemy.

Captain Andre W. Brewster, 9th U. S. Infantry, for conspicuous gallantry during the battle of Tientsin, China, July 13, 1900. One of his men was twice wounded and fell into a pond of water about eight feet deep and was helpless and drowning when Captain Brewster, fully accoutered, jumped into the water and saved him.

First Lieutenant Charles E. Kilbourne, U. S. Volunteer Signal Corps, at Paco Bridge, Philippine Islands, on February 3, 1899, within a range of 250 yards of the enemy, and in the face of a rapid fire, climbed a telegraph pole in full view of the enemy and coolly and carefully repaired a broken telegraph wire, thereby reestablishing telegraph communication between headquarters and the front lines.

Major Paul F. Straub, Surgeon of the 36th U. S. Volunteer Infantry, at Alos, Philippine Islands, December 21, 1899, voluntarily exposed himself to a hot fire from the enemy in repelling with pistol fire an insurgent attack, and, at great risk to his own life, went under fire to the rescue of a wounded fellow officer and carried him to a place of safety.

Assistant Surgeon James Robb Church, 1st U. S. Volunteer Cavalry, better known as the "Rough Riders," for conspicuous gallantry at Las Guasimas, Cuba, June 24, 1898. In addition to performing gallantly the duties pertaining to his position he vol-

untarily and unaided carried several seriously wounded men from the firing-line to a position of safety in the rear, in each instance being subjected to a very heavy fire from the enemy.

Private Cornelius J. Leahy, 36th U. S. Volunteer Infantry, for most distinguished gallantry in action at Porac, Luzon, Philippine Islands, September 3, 1899. Leahy with the assistance of one comrade carried from the field of action the bodies of two comrades, one killed and one severely wounded, defending them from the attacks of the enemy and driving off a much superior force of insurgents. The order also briefly notes that Private Leahy was killed in action December 1, 1900, at Pilar, Philippine Islands.

Captain Hugh J. McGrath, 4th U. S. Cavalry, for most distinguished gallantry at Calamba, Luzon, Philippine Islands, on July 26, 1899, in swimming the San Juan River in the face of the enemy's fire and driving him from his entrenchments. The order closes with the brief notation, "Died November 7, 1899."

First Lieutenant Albert L. Mills, 1st U. S. Cavalry, and captain and assistant adjutant general of U. S. Volunteers, for distinguished gallantry in action at Santiago, Cuba, July 1, 1898, in encouraging those near him by his bravery and coolness after being shot through the head and entirely without sight.

Private John C. Wetherby, 4th U. S. Infantry, for most distinguished gallantry in action near Imus, Luzon, Philippine Islands, November 26, 1899. He had been entrusted with the duty of carrying important orders on the battlefield and while doing so was desperately wounded. Unable to stand he crawled forward on the ground and delivered his messages. He died of his wounds nine days later.

Second Lieutenant George W. Wallace, 9th U. S. Infantry, for gallantry at Tinuba, Luzon, Philippine Islands, March 4, 1900, in rescuing a brother officer who had been wounded by Filipinos from ambush and carrying him to a place of safety.

Privates William B. Trembly and Edward White, 20th Kansas Volunteer Infantry, for most distinguished gallantry at Calumpit, Luzon, Philippine Islands, April 27, 1899. These men swam across the Rio Grande de Pampanga in the face of heavy enemy fire, carrying a rope which they fastened to the trenches occupied by the enemy in order to enable others to cross the river and drive the enemy out of the trenches.

Captain Horace Porter, Ordnance Department, U. S. Army (afterwards Brevet Brigadier General), for gallantry in action at the battle of Chickamauga, Georgia, in rallying enough fugitives to hold the ground at a critical moment when the lines were broken, under heavy fire, long enough to facilitate the escape of numerous wagon trains and batteries.

Sergeant Henry F. Schroeder, 16th U. S. Infantry, for most distinguished gallantry in action at Carig, Philippine Islands, September 14, 1900, in defeating with 22 men under him a force of 400 insurgents, killing 36 and wounding 90 of the enemy.

The following instances of the award of the medal of honor to officers and enlisted men of the naval service—the navy and the marine corps—are taken from the orders of the Navy Department announcing the awards to the service:

On May 11, 1898, the torpedo-boat *Winslow*, while closely engaged with the enemy shore batteries at Cardenas, Cuba, was disabled by the concentrated fire of the enemy and was towed out of range by the revenue cutter *Hudson*. For especial gallantry on this occasion three members of the crew of the *Winslow* were awarded medals of honor: Chief Gunner's Mate Brady for repairing the steering gear under heavy fire, Chief Machinist Cooney for extinguishing the fire in a boiler that had been pierced by a shell, and Chief Machinist Johnson for turning off steam from the engine which was wrecked by a shell exploding in the cylinder. Each of these men without regard to his own safety or life performed a deed that may have saved the vessel and its crew from destruction.

On June 14, 1898, while the marines who were defending the temporary naval shore base at Guantanamo, Cuba, were engaged with enemy infantry, firing from hastily thrown up field trenches, it became necessary to communicate with the U. S. S. *Dolphin* in order to direct the fire of her guns. Sergeant John Quick, U. S. M. C., seized a signal flag and sent the signals. To do this it was necessary for him to leave cover and stand on the crest of the hill with his back to the enemy and clearly silhouetted against the sky. This drew the fire of the enemy, whose bullets sung past him and bit the dust at his feet, but he remained at his post and sent the signals with coolness and precision. For this cool and gallant act under fire he was awarded the medal of honor.

The U. S. flagship *New York* was steaming along the coast of

Jamaica on March 31, 1899, with a stiff breeze blowing and a considerable sea running, when Peter Mahoney, water tender, U. S. Navy, accidentally fell overboard. Mahoney was unable to swim and seeing him sinking Chief Master-at-Arms John Stokes instantly leaped into the sea, swam to the sinking man and kept him above water until a boat could be lowered from the ship to rescue them, for which self-sacrificing act of gallantry he was presented the medal of honor.

Sergeant J. H. Helms, U. S. M. C., was awarded the medal of honor for jumping overboard from the U. S. S. *Chicago*, off Montevideo, Uruguay, on January 10, 1901, and rescuing Ishi Tomazo, warrant officers' steward, from drowning. Helms was in full uniform and wore his belt and side-arms, but did not stop even long enough to remove his belt, and the order states that it was the second time he had performed a similar act.

The U. S. S. *Hornet* and U. S. S. *Wompatuck*, two small vessels of the blockading squadron off the coast of Cuba, were engaging the shore forces of the enemy at Manzanillo when the *Hornet* was disabled by the enemy fire and had to be towed out by the *Wompatuck*. To secure the towing lines to the disabled vessel required skillful work and cool daring under fire, and the work was so well done by Mate Frederick Muller, U. S. Navy, that he was promoted to the rank of boatswain and awarded the medal of honor.

During the Boxer Rebellion in China in 1900 there was hot fighting for the soldiers, sailors and marines of the International Relief Forces all the way from the sea at Tientsin over the 90 miles of swamp and plain to the capital at Peking, and many deeds of valor were recorded in the reports and accounts of the running fight.

During the advance along the Pei-Ho River on June 20 the column was being subjected to the fire of Chinese snipers, concealed behind salt ricks and wooden shacks across the river. A squad of four men, led by Corporal E. N. Appleton, U. S. M. C., with Privates Burns and Heisch, U. S. M. C., and Coal Passer McAllister, U. S. Navy, volunteered to cross the river in a small row-boat and set fire to the shacks that afforded cover to the enemy. They carried out this undertaking under heavy fire, which wounded two of them, and were entirely successful. For the performance of this hazardous voluntary duty under a fire

to which they could not reply each of these men was awarded a medal of honor.

The U. S. S. *Yorktown* was lying at anchor off Yokohama, Japan, on April 27, 1902, with her steam launch secured astern. The weather was bad and a choppy cross sea was running. The gage glass on the launch's boiler blew out and Machinist Wisnieski, cut by the flying glass and severely scalded by hot steam, jumped overboard to escape the steam and scalding water, but he could not keep afloat and Coxswain Joseph Quick jumped overboard from the launch and carried a buoy to the drowning man. Both appeared to be in danger of drowning and seeing their plight Ensign J. H. Taussig leaped overboard from the ship's deck, swam to them and managed to keep them afloat until a boat could be lowered from the ship and sent to the rescue. For these self-sacrificing acts of gallantry Coxswain Quick was awarded a medal of honor and Ensign Taussig a silver life-saving medal.

On July 3, 1916, the 23d Company of U. S. Marines was engaged with Dominican armed forces at Guayacanes, Santo Domingo, and after a running fight of nearly a mile our forces reached the enemy entrenched position. Corporal Glowin at once placed a machine gun behind a log across the road and opened fire. He was soon wounded by an enemy bullet, but stuck to his gun and kept up the fire and a moment later was wounded a second time and had to be dragged from his gun to a covered position. Thereupon Sergeant Roswell Winans placed a Colt machine gun in the exposed roadway and coolly opened fire. The gun jammed, but Winans repaired it, having to stand up to do so, and continued the fire until the enemy broke cover and ran. All of this time Glowin and Winans were under heavy fire, eight of their comrades being killed or wounded within 20 feet of them. Both were awarded medals of honor for "eminent and conspicuous courage in the presence of the enemy."

On a beautiful July day in 1905 the U. S. S. *Pennington* was lying peacefully at anchor in the harbor of San Diego, California, when with frightful suddenness the boilers exploded, practically destroying the ship and killing and maiming many of her crew. This crisis which occurred with such terrible suddenness and destruction was met by the ship's officers and crew with the readiness and resource which is traditional in the American

Navy. Men grievously wounded forgot their own injuries and rushed back amid a shower of scalding water, steam and hot ashes to rescue their more unfortunate shipmates. So fine was the conduct of all that it was difficult to select the most heroic, but after careful consideration of the records medals of honor were awarded to 11 of the enlisted men. Among these were Gunner's Mate Clausey, who rushed below to flood the powder magazines and prevent their explosion and afterwards rescued many from below decks; Boatswain's Mate Cronan, who was blown overboard by the explosion, but who instead of swimming the short distance to the shore swam to the after gangway of the ship, climbed aboard and rushed below decks to rescue injured shipmates; and Seaman Gerbich, who rushed into the boiler room and regardless of the heated steam and smoke attempted to stop holes in the ship's bottom and save her from sinking.

During the battle of Santiago on July 3, 1898, a cartridge jammed in one of the guns of the U. S. flagship *Brooklyn*, putting the gun out of action. Private Harry McNeal, U. S. M. C., one of the gun's crew, left the shelter afforded by the gunshield, crawled out on the hot barrel of the gun and with a rammer inserted into the muzzle of the gun forced the cartridge out of the breech in order that the gun might be fired again. He was awarded the medal of honor for conspicuous courage and coolness under fire.

The crown sheets on one of the boilers of the U. S. S. *Puritan* collapsed while she was under steam on July 1, 1897; blinding hot steam and boiling water poured into the fire-rooms, driving everyone out, and it looked as if the other boilers would explode and destroy the ship and her crew, but American resource and courage came to the rescue again. Boiler-maker August Wilson and Water Tender William O'Hearn wrapped their faces and arms in wet clothes and regardless of personal safety went into the fire-room, crawled over the tops of the boilers and closed the connecting valves, and thus averted a further catastrophe. Both received the medal of honor for this courageous act.

The records of the Navy Department show that " on November 29, 1916, First Lieutenant Ernest C. Williams, U. S. M. C., with 12 men charged a fort at San Francisco de Macoris, Santo Domingo, in the face of a fire from about 40 rifles, hurled himself against the doors just as they were being closed, was the

first inside, and, without the loss of a single man, but with eight of his original detachment of 12 men wounded, succeeded in the capture of the fort." For this extraordinary heroism in the face of the enemy Lieutenant Williams was awarded the medal of honor.

At 10 p. m. on May 28, 1899, Quartermaster William Stevens, U. S. Navy, accidentally fell out of the bridle port of the U. S. S. *Alliance* and into the sea. Chief Boatswain's Mate Patrick Shanahan had turned in for the night, but, hearing the cry of Stevens and the splash as his body struck the water, jumped from his hammock and overboard to the rescue. The night was very dark, but Shanahan found Stevens and kept him afloat until a boat could be lowered from the ship to rescue them. For this resourceful and courageous deed Shanahan was awarded the medal of honor.

After dark on the night of October 24, 1915, Captain William P. Upshur, U. S. M. C., in command of a detachment consisting of three officers and 35 enlisted men, while engaged in making a reconnaissance through the tropical jungle in Haiti, was suddenly fired upon by about 400 Cacos concealed in the underbrush surrounding Fort Dipitie. The detachment fought its way forward to a good position which it maintained during the night although constantly under fire. At daybreak the marines in three squads, commanded by Captain Upshur, First Lieutenant E. A. Ostermann and Gunnery Sergeant Daniel Daly, advanced upon the enemy from three different directions, surprised and scattered them and captured the fort. "The actual assault upon the enemy, made in three different directions and made as soon as the light permitted them to see, was splendid; it meant success or utter annihilation. It succeeded, thanks to the splendid examples given by the officers and non-commissioned officers, supported by the men." As a result of this engagement Captain Upshur, Lieutenant Ostermann and Gunnery Sergeant Daly were awarded the medal of honor for conspicuous gallantry in action.

While the U. S. S. *North Dakota* was making tests with oil as fuel on September 8, 1910, an explosion occurred, resulting in the death of three enlisted men and greatly endangering the ship. Six enlisted men of the engineering division of the ship hauled the fires in the furnaces of the boilers while the oil was burning on top of one of the boilers and took the necessary precautions to prevent the boilers from exploding, and then

searched for and carried out the bodies of the three men who had been killed by the explosion. This work was done in hot water up to the waists of the men, in dense smoke, heat, fumes from burning oil, and gas and steam arising from the hot coal and coke floating on the water. For their extraordinary heroism in saving the ship and her crew at the imminent risk of their lives these men were awarded the medal of honor.

The U. S. S. *Nashville* and the U. S. S. *Marblehead* were detailed to cut out the submarine telegraph cables leading from the port of Cienfuegos, Cuba, on May 11, 1898, during the war with Spain. The work was performed by 19 sailors and seven marines in a sailing launch from the *Nashville* and 19 sailors and five marines in a sailing launch from the *Marblehead*. The task required three and a quarter hours of hard work with the boats close in shore and constantly exposed to the rifle fire of the enemy from concealed positions on shore, and as a reward for their cool and gallant work under fire every one of the two boats' crews was awarded the medal of honor.

For distinguished conduct and extraordinary heroism in battle during the seizure of Vera Cruz, Mexico, on April 21 and 22, 1914, a number of officers and enlisted men of the navy and marine corps were awarded medals of honor. These deeds of valor included rescuing wounded men under heavy fire, occupying especially exposed positions in order to send and receive signals, taking small boats along the waterfront of the city to draw the fire of the enemy in order that the enemy positions might be definitely located, and exhibiting courage in exposed positions to set an example to the others of the command.

A recent general order of the Navy Department announces to the service the award of the medal of honor to Ship Fitter Patrick McGunigal, U. S. Navy, for "extraordinary heroism in the line of his profession," and in the order the Secretary of the Navy states that "McGunigal's deed of heroism was incidental to war conditions and he has the honor of receiving the first medal of honor awarded during the war with Germany."

The deed for which this medal was awarded is described in the order as follows: "On the morning of September 17, 1917, while the U. S. S. *Huntington* was passing through the war zone, a kite balloon was sent up with Lieutenant (junior grade) Henry W. Hoyt, U. S. Navy, as observer. When the balloon was about

400 feet in the air, the temperature suddenly dropped, causing the balloon to descend about 200 feet, when it was struck by a squall. The nose of the balloon dipped downward into a long nose dive, and it started to roll over. The pilot was inside the basket and could not get out, due to the tangle of ropes overhead. Finally the balloon was hauled to the ship's side, but the basket trailed in the water and the pilot was submerged. McGunigal with great daring climbed down the side of the ship, jumped to the ropes leading to the basket and cleared the tangle enough to get the pilot out of them, helped the pilot to get clear, put a bowline around him and he was hauled to the deck. A bowline was lowered to McGunigal and he was taken safely aboard. McGunigal's action in going to the rescue of this officer was an extraordinary exhibition of self-sacrifice as McGunigal well knew that if he failed there was no chance of himself being rescued."

THE MANILA BAY MEDAL

At the opening of the war with Spain on April 24, 1898, the U. S. Asiatic squadron, under command of Commodore George Dewey, lay at the British colonial port of Hong Kong, China, 630 miles north of Manila, the capital of the Spanish possessions in the Philippine Islands. Three days later the squadron, consisting of the cruisers *Olympia, Baltimore, Raleigh* and *Boston,* the gunboats *Concord* and *Petrel,* the revenue cutter *McCullough,* and the recently purchased supply ships *Zafiro* and *Nanshan,* put to sea under orders from Washington "to proceed to the Philippines and capture or destroy the Spanish ships based there."

How Dewey ran past the batteries at the entrance to Manila Bay under cover of the night, attacked the Spanish squadron at dawn the following day, May 1, 1898, and completely destroyed the 12 ships of the enemy squadron before noon of the same day is a part of the familiar history of the American Navy. When the news of the victory reached Washington a thrill went through the people of the land, which was given effect by the Congress in a resolution of May 10, 1898, extending the thanks of Congress to Commodore Dewey and the officers and men under his command for the gallantry and skill exhibited by them at the battle of Manila Bay.

As a further reward a joint resolution of Congress, approved by the President on June 3, 1898, provided, "That the Secretary

of the Navy be, and he hereby is, authorized to present a sword of honor to Commodore George Dewey, and to cause to be struck bronze medals commemorating the battle of Manila Bay, and to distribute such medals to the officers and men of the ships of the Asiatic squadron of the United States under command of Commodore George Dewey, on May first, eighteen hundred and ninety-eight."

This medal is officially styled the Congressional medal commemorating the battle of Manila Bay, but is usually referred to as the Manila Bay medal, or more popularly as the Dewey medal. It is made of bronze taken from one of the captured cannon and was modeled by the sculptor, Daniel C. French, and is suspended from a bronze bar by means of a ring on the upper edge of the medal, a ring on the lower edge of the bar and one circular link. A distinctive peculiarity of this medal is that the ribbon, instead of being used to suspend the medal as in all other cases, is attached to the bar only and hangs back of the medal.

The obverse bears an excellent bust likeness of Commodore Dewey in special full dress uniform, the inscription, "The gift of the people of the United States to the officers and men of the Asiatic squadron under the command of Commodore George Dewey," and to the right of the bust a small laurel wreath for victory, an anchor to symbolize the sea, and one star representing the insignia of the rank of commodore. The reverse bears the figure of a seaman, "stripped to the waist," seated upon the chase of a ship's great gun, and with both hands grasping the staff of a flag which is draped across his lap; the figure being surrounded by the inscription, "In memory of the victory of Manila Bay, May 1, 1898." Below the figure is a tablet upon which is stamped the name of the ship upon which the recipient served during the battle, and his name and rank is stamped around the edge of the medal.

The bar from which the medal is suspended is decorated by an American eagle with wings spread above the waves of the sea, with a sword hilt to the right and an olive branch to the left.

The distinctive ribbon for the medal, having a wide yellow stripe through the center with a narrower stripe of blue at each edge, was chosen on account of the fact that "blue and gold" are the navy colors.

MEDAL FOR NAVAL ENGAGEMENTS, WEST INDIES, 1898

During the war with Spain in 1898 the vessels of the U. S. Atlantic fleet, under the command of Rear Admiral William T. Sampson, operating in West Indian waters took part in numerous engagements with the Spanish ships and shore batteries, culminating in the battle of Santiago on July 3, which resulted in the total destruction of all the ships of the Spanish squadron under command of Admiral Cervera.

To reward the officers and men who participated in these engagements a joint resolution of Congress, approved by the President on March 3, 1901, provided, "That the Secretary of the Navy be, and he hereby is, authorized to cause to be struck bronze medals commemorative of the naval and other engagements in the waters of the West Indies and on the shores of Cuba during the war with Spain, and to distribute the same to the officers and men of the navy and marine corps who participated in any of said engagements deemed by him of sufficient importance to deserve commemoration: *Provided,* That officers and men of the navy or marine corps who rendered specially meritorious service, otherwise than in battle, may be rewarded in a like manner: *And, provided further,* That any person who may, under the provisions of this act, be entitled to receive recognition in more than one instance shall, instead of a second medal, be presented with a bronze bar, appropriately inscribed, to be attached to the ribbon by which the medal is suspended."

In accordance with this resolution of Congress two medals were designed: the first to be presented to the officers and men of the navy and marine corps who participated in the battle of Santiago and the other naval engagements afloat and in the engagements ashore at Guantanamo, and the second to be awarded to certain officers and men for specially meritorious service other than in battle.

The first of those medals, officially styled the Congressional medal commemorating the naval engagements in the war with Spain, but popularly known as the Sampson medal, is of bronze, bearing on the obverse the bust of Rear Admiral Sampson with "William T. Sampson" to the left and "Commander-in-chief" to the right of it, surrounded by the inscription, "U. S. Naval Campaign, West Indies, 1898," and on the reverse a group of

three figures on the deck of a ship of war, the central figure being an officer, the one to the left a seaman firing a rapid-fire gun, and the one to the right a marine sharpshooter with rifle in hand. Below this group upon a tablet is the name of the engagement and still below this the month and day.

The medal is suspended by the distinctive ribbon of three stripes, red, blue, red, from a bronze bar bearing the name of the ship upon which the recipient served. If bars have been awarded for additional engagements they are attached above the first bar by rings and links. The name and rank of the recipient is stamped around the edge of the medal.

On the medal Admiral Sampson is shown in the white service uniform of 1898, with the insignia of a captain in the navy upon the shoulder strap, although he was a rear admiral at the time.

MEDAL FOR MERITORIOUS SERVICE OTHER THAN IN BATTLE, 1898

The second medal authorized by the resolution of Congress of March 3, 1901, was provided to reward officers and men of the navy and marine corps who rendered particularly meritorious or hazardous service other than in battle during the war with Spain. These services included the sinking of the *Merrimac* in the entrance to the harbor of Santiago, the reconnaissance of that harbor from the land side which resulted in the definite determination of the Spanish naval forces, and the cutting of submarine telegraph cables under fire.

The decoration consists of a bronze cross pattée with a circular central medallion, upon which is a foul anchor surrounded by the words, "U. S. Naval Campaign, West Indies." The four arms of the cross bear the words and date, "Specially Meritorious Service, 1898." The reverse of the medal is plain, with the name and rank of the recipient and the event, with the date, for which awarded. The ribbon is red.

CONGRESSIONAL MEDAL FOR PHILIPPINE SERVICE

The war with Spain was closely followed by the Philippine insurrection which terminated in 1903. At the outbreak of this insurrection many officers and men of the U. S. Army who had volunteered "for the term of the war with Spain" were still in the Philippine Islands, and though they could not be legally held

CUBAN PACIFICATION

CHINA RELIEF EXPEDITION

MEXICAN CAMPAIGN

HAITIAN CAMPAIGN

U. S. NAVY CAMPAIGN BADGES

WAR WITH SPAIN

PHILIPPINE INSURRECTION

CHINA RELIEF EXPEDITION

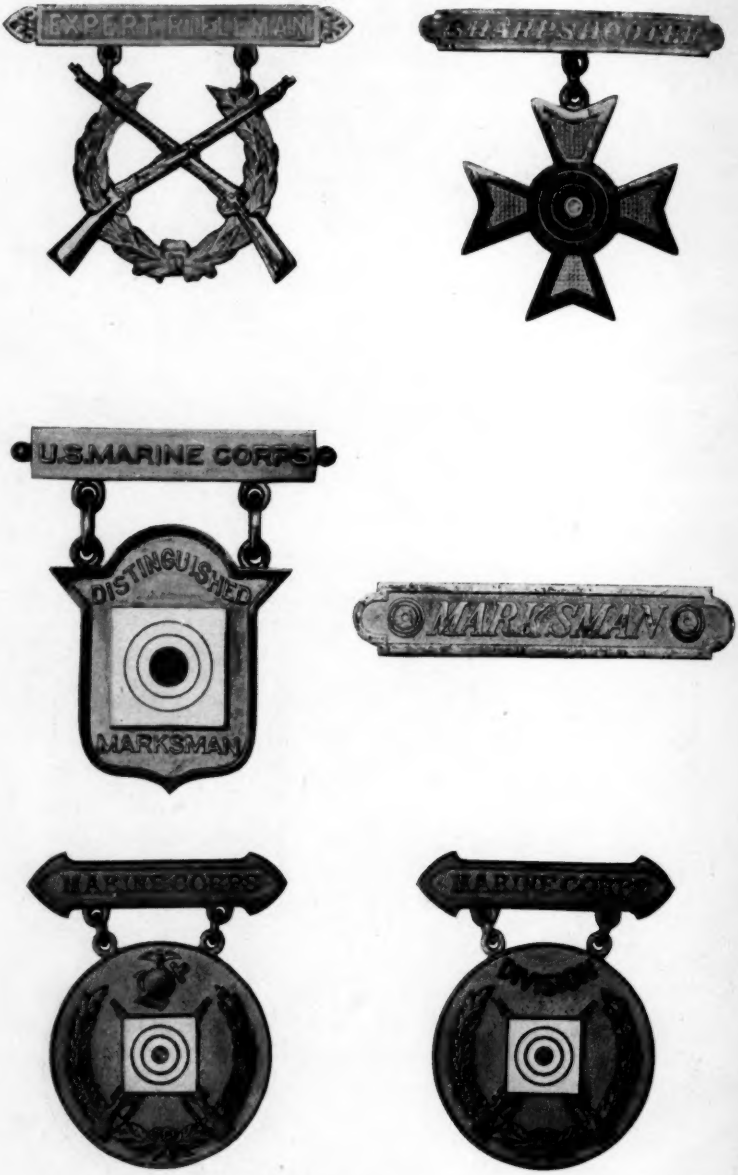
CUBAN PACIFICATION

U. S. ARMY CAMPAIGN BADGES

SPECIAL MERITORIOUS SERVICE, WAR WITH SPAIN, U. S. NAVY

GOOD CONDUCT MEDAL
U. S. NAVY

GOOD CONDUCT MEDAL
U. S. MARINE CORPS



U. S. MARINE CORPS MEDALS AND BADGES FOR RIFLE PRACTICE

for service against the insurrectionists after the treaty of peace with Spain, many thousands of them willingly so served beyond the terms of their enlistment.

The faithful services of these men were recognized and rewarded by an act of Congress, approved by the President on June 29, 1906, which provided that a bronze medal with suitable devices be presented to those officers and men "who, having volunteered and enlisted under calls of the President for the war with Spain, served beyond the term of their enlistment to help to suppress the Philippine insurrection."

The obverse of this medal bears a design of a group consisting of three marching soldiers, the central one carrying the national colors and the other two carrying rifles at the shoulder, encircled by the legend "Philippine Insurrection, 1899." On the reverse side is the inscription, "For Patriotism, Fortitude and Loyalty," encircled by a wreath composed of a branch of pine and a branch of palm.

The distinctive ribbon has a wide band of blue through the center with four narrow stripes on either side, colored white, red, white, blue, from the center outward.

CERTIFICATE OF MERIT BADGE, U. S. ARMY

The U. S. Army Regulations, published by order of the President, prescribe that, "when any enlisted man in the army shall have distinguished himself in the service, the President may grant a certificate of merit to him, on the recommendation of the commanding officer of the regiment or chief of the corps to which such man belongs."

In 1905 a general order of the War Department announced that a badge with ribbon would be issued to each officer and enlisted man to whom a certificate of merit has been or may hereafter be awarded.

This badge is of bronze and of the same size as the campaign badges, one and one-quarter inches in diameter. On the obverse is a Roman war eagle surrounded by the inscription," Virtutis et audaciae monumentum et praemium," and on the reverse side the words, "For merit," in a wreath of oak leaves with the words "United States Army" in a semicircle above and 13 stars similarly arranged below.

The distinctive ribbon of the badge has a narrow white stripe through the center with three bands of equal width on either side of it, the colors being red, white and blue, from the center outward.

GENERAL SERVICE MEDALS

Up to 1905 no medals for general service in wars or campaigns were issued by the United States Government to its soldiers and sailors, but in that year it was decided to issue such medals to be officially known as "campaign badges," and a general order of the War Department stated that, "by authority of the President, campaign badges with ribbons will be issued as articles of uniform to officers and enlisted men in the service to commemorate services which have been or shall hereafter be rendered in campaign."

General service medals for navy and marine corps were authorized by the act of Congress of March 3, 1909, and subsequent acts, providing for "badges and ribbons, to be distributed by the Secretary of the Navy to officers and men, now or formerly, of the volunteer or regular navy and marine corps, who have participated in engagements and campaigns deemed worthy of such commemoration."

The campaign badges issued to officers and men of the army are different in design from those issued to the officers and men of the navy and marine corps for participation in the same campaigns. The distinctive ribbons for the badges were also different for the two services prior to March 1, 1913, upon which date the President approved of a recommendation of the joint board of the army and navy to make the ribbons identical for all services.

Campaign badges have accordingly been issued to the officers and men of the army, navy and marine corps who have seen honorable service in the Civil War and in all subsequent battles and campaigns up to the beginning of the present war, as follows:

CIVIL WAR CAMPAIGN BADGE

The badge was issued to all who saw service in the regular or volunteer army, navy or marine corps during the Civil War between April 15, 1861, and April 9, 1865. The distinctive ribbon is very appropriately composed of two bands, blue and gray, of

equal width. The obverse of the army badge shows the head of Lincoln surrounded by the words, "With malice towards none, with charity for all," and on the reverse are the words, "The Civil War" and the dates, "1861-1865," surrounded by a wreath of oak and laurel.

The obverse of the navy and marine corps badge shows the famous battle between the *Monitor* and the *Merrimac,* fought in the waters of Hampton Roads on March 9, 1862, with the words, "The Civil War" above and the dates, "1861-1865," below. The reverse of the navy badge bears an eagle perched upon a foul anchor and directly below the words, "For Service," surrounded in a circle by the legend, "United States Navy" in the upper half and branches of laurel and oak in the lower half. The reverse of the marine corps badge is the same as for the navy, except that the legend reads, "United States Marine Corps."

The reverse side of all of the other campaign badges for the navy and marine corps is the same as that for the Civil War campaign badge.

INDIAN CAMPAIGN BADGE

Every officer and enlisted man of the U. S. Army who took an honorable part in any of the campaigns or battles waged against the hostile Indian tribes between 1865 and 1891 received one of these badges.

The campaigns so honored included the battles in Oregon, Idaho, California and Nevada from 1865 to 1868; campaigns against the Cheyennes, Arapahoes, Kiowas and Comanches, in Kansas, Colorado and Indian Territory, 1867 to 1869; the Modoc war, 1872-1873; against the Apaches in Arizona, 1873; against the Kiowas, Comanches and Cheyennes, 1874-1875; against Cheyennes and Sioux, 1876-1877; Nez Perces War, 1877; Bannock War, 1878; against Northern Cheyennes, 1878-1879; against the Utes, 1879-1880; against the Apaches in 1885-1886; and against the Sioux under the famous chief, Sitting Bull, 1890-1891.

The badge is of bronze and the obverse bears a mounted Indian wearing his war bonnet and carrying a spear, with the words, "Indian Wars" above and a buffalo skull with arrow heads on either side below. The reverse side bears a trophy composed of an eagle perched on a cannon, an Indian shield, standards, rifles, spears, arrows, a Cuban machete and a Sulu kriss, with the words

"For Service" below it. Above the trophy in a semicircle are the words, "United States Army," and below it 13 stars similarly arranged.

The distinctive ribbon is Indian red with a narrow black stripe near each edge.

The reverse side of all subsequent campaign badges issued to the officers and men of the army is the same as that for the Indian campaign badge.

SPANISH CAMPAIGN BADGE

The badge was issued to all officers and enlisted men of the U. S. Army who saw active service on the high seas en route to or ashore in Cuba between May 11 and July 17, 1898, in Porto Rico between July 24 and August 13, 1898, or in the Philippine Islands between June 30 and August 16, 1898; and to all officers and men of the navy and marine corps who served honorably aboard a ship of the navy or who saw active service ashore in Cuba, Porto Rico, the Philippine Islands or Guam during the war with Spain.

The first ribbon adopted for the army badge was yellow, with a narrow stripe of red near each side edged with blue, while that for the navy badge was yellow with a narrow red stripe near each edge, very similar to the Spanish flag; but since March 1, 1913, the ribbon has been the same for both services, yellow with narrow blue stripes near each edge.

The obverse of the army badge bears a conventional castle with round towers added at each corner, one for Havana and one for Santiago de Cuba, surrounded in a circle by the legend, "War with Spain," the date "1898," a tobacco plant and a stalk of sugar cane.

The design on the obverse side of the badge for the navy and marine corps consists of the Morro Castle at the entrance to Havana harbor, surrounded by the legend, "Spanish Campaign," and the date, "1898."

A badge of the same design and with the same ribbon was issued to the officers and men of the navy and marine corps who participated in the naval battles and campaigns in the West Indies during the war with Spain, the legend reading, "West Indies Campaign."

Philippine Campaign Badge

The Philippine insurrection broke out on February 4, 1899, and was officially declared to be suppressed on July 4, 1903. The officers and enlisted men of the army, navy and marine corps who participated in any of the campaigns or engagements during this period were given the campaign badge, and it was also given to those who took part in the operations against the natives in Mindanao during 1904-1906.

The ribbon of this badge is dark blue with a narrow stripe of blue near each edge. The original navy ribbon was composed of three stripes, red, yellow, red; but on March 1, 1913, the army ribbon was ordered to be used with the badge by all services.

The obverse of the army badge has a cocoanut tree with balance scales on the right and a Roman lamp on the left, and the legend, "Philippine Insurrection, 1899"; while the badge for the navy and marine corps has on the obverse a design of the old gate in the city wall of Manila and the legend, "Philippine Campaign, 1899-1903."

Army of Cuban Occupation Badge

After the close of the war with Spain a Military Government administered the affairs of Cuba pending the establishment of the Republic of Cuba in accordance with the terms of the Platt Amendment. The great constructive work—sanitation, establishment of schools and road building—accomplished by the army of occupation was commemorated by the issue of a campaign badge to the officers and men who took part. The obverse is ornamented with the coat of arms of the Republic of Cuba with the dates "1898" and "1902" to the left and right of it, surrounded by the legend, "Army of Occupation, Military Government of Cuba." The ribbon has a central blue stripe edged with yellow, with a red stripe edged with blue on either side.

The China Campaign Badge

When the Boxer Rebellion in 1900 threatened the lives of all foreigners sojourning in China small detachments of sailors, marines and soldiers from the American, British, French, German, Japanese and Russian cruisers in nearby waters were sent to Peking to act as legation guards. Shortly after their arrival the Chinese troops cut the line of communications between Peking

and the sea at Tientsin and from June 4 until August 15, 1900, the foreign legations and their nationals who had taken refuge therein were closely besieged. On the latter date the Relief Expedition, consisting of American, British, French, German, Japanese and Russian troops, totaling 12,000, entered Peking and relieved the besieged legations after capturing Tientsin and fighting through the 90 miles that lie between that port and the capital of China.

To commemorate this event the China campaign badge was issued to each officer and man of the American legation guard of marines and to the officers and men of the army and navy who took part in the Relief Expedition, either afloat or ashore.

The distinctive ribbon is of imperial Chinese yellow, edged with blue.

The obverse of the army badge bears the imperial Chinese five-toed dragon, surrounded by the legend, "China Relief Expedition, 1900-1901"; while the badge issued to the officers and men of the navy and marine corps bears a representation of the Chienmen, the main gateway to the walled city of Peking, with an imperial dragon below, surrounded by the legend, "China Relief Expedition, 1900."

THE CUBAN PACIFICATION BADGE

In October, 1906, a revolution in Cuba threatened the stability of the new republic and a U. S. naval force was sent to preserve order. Two regiments of marines were landed for the protection of foreign property and the preservation of order, but as the Cuban Government appeared to be unable to reestablish law and order throughout the island, the United States intervened, pursuant to the provisions of the Platt Amendment under which the Republic of Cuba had been established, and for three years administered the government.

A governor, appointed by the President of the United States, assisted by a force of soldiers from the army and marine corps, known as the army of Cuban pacification, conducted the government ashore, and cruisers and gunboats of the navy patrolled the harbors and waters adjacent to the island.

A campaign badge was issued to all of the officers and men of the army, navy and marine corps who participated in these operations. The distinctive ribbon has a wide band of the olive drab

of the U. S. Army field uniform through the center, with narrow stripes of red, white and blue on either side.

The obverse of the army badge bears the coat of arms of the Cuban Republic supported on either side by an American soldier, with the legend, "Cuban Pacification," above, the dates, "1906-1909," below; and the obverse of the badge issued to the navy and marine corps represents Columbia presenting the olive branch to Cuba, while the dove of peace hovers above, the legend being, "Cuban Pacification, 1908."

Nicaraguan Campaign Badge

In 1912 a revolution in Nicaragua threatened the disruption of the republic and a force of sailors and marines was landed to establish order and good government. This force inflicted a decisive defeat upon the revolutionists who opposed them and quickly brought order out of chaos. A campaign badge was issued to each officer and man of the navy and marine corps who participated. The ribbon is dark red with blue stripes near each edge, and the obverse of the badge shows the smoking volcanic peak of Mount Momotombo rising from Lake Managua beyond a tropical forest, with the legend, "Nicaraguan Campaign, 1912."

The Mexican Campaign Badge

The revolution and counter-revolutions in Mexico between 1911 and 1917 made it necessary for the United States to maintain strong patrols of army troops along the border and of cruisers and gunboats along both the Atlantic and Pacific coasts of that country, to send the punitive expedition across the Rio Grande into Mexico, and to conduct the naval and military operations against Vera Cruz in 1914.

To commemorate this service the badge known officially as the Mexican service badge was issued to the officers and men of the army, navy and marine corps who participated in these operations. The distinctive ribbon of this badge is yellow, blue, yellow, with green edges.

The obverse of the army badge is decorated with a yucca plant in bloom, with hills in the background, and the legend, "Mexican Service, 1911-1917"; and that of the badge for the navy and marine corps shows the old castle of San Juan de Ulloa, with the legend, "Mexican Service, 1914."

THE HAITIAN CAMPAIGN BADGE

In 1915 the little island republic of Haiti was torn with the strife of revolution to such an extent that it became necessary for the United States to intervene for the protection of the Haitians against themselves and to establish a stable government. A brigade of marines supported by a squadron of cruisers and gunboats of the navy brought peace and order to the island in a campaign that lasted from July 9 to December 6, 1915. To guard against future disorder and revolution a gendarmerie was established to police the country, this force consisting of native Haitian enlisted men, officered by officers and non-commissioned officers of the U. S. Marine Corps.

A bronze campaign badge was issued to the officers and men of the navy and marine corps taking part in the active campaigning and fighting of this expedition, the ribbon of blue with two narrow red stripes through the center being chosen because these are the colors of the uniforms and facings of the Haitian troops. The design on the obverse of the medal shows the mountains of Cape Haitien with the sea in the foreground, surrounded by the legend, "Haitian Campaign, 1915."

GOOD CONDUCT MEDALS

Any enlisted man of the navy or marine corps who has served one full enlistment of four years with marked attention to all of his duties and is recommended by his commanding officer for obedience, sobriety, industry, courage, neatness and proficiency is awarded a good conduct medal. If a man who has received a good conduct medal should be so recommended at the expiration of a subsequent term of four years service he is awarded a bar to be worn upon the ribbon of the medal.

The ribbon for the navy medal is red and that for the marine corps medal dark red with a blue stripe through the center.

The obverse of the navy medal has a vertical ship's anchor surrounded by the anchor chain and a central medallion bearing a representation of the sailing frigate *Constitution,* launched in 1797. This famous ship is still afloat and now bears the name *Old Constitution,* the name *Constitution* having been assigned to one of the new battle cruisers now building.

The obverse of the marine corps medal bears a ship's anchor and chain with a central medallion showing a marine standing at

the breach of a rapid-fire gun, and a scroll carrying the motto of the corps, " Semper Fidelis."

The reverse of both medals has the inscription, " Fidelity—Zeal—Obedience," in a circle, enclosing the name of the recipient, the date of his first enlistment and the ship on which he served.

THE GOLD AND SILVER LIFE SAVING MEDALS

Various acts have been passed by Congress authorizing the Secretary of the Treasury to bestow life saving medals upon " any persons who shall hereafter endanger their own lives in saving, or endeavoring to save, lives from perils of the sea, within the United States, or upon an American vessel." The first of these acts, approved by the President on June 20, 1874, authorized two classes of these medals, the first class to be confined to cases of extreme and heroic daring and the second class to be given in cases not sufficiently distinguished to deserve the medal of the first class.

Subsequent acts prescribed that the first class medal should be made of gold and that of the second class of silver. These life saving medals are awarded to both civilians and members of the naval and military services and in the latter case medals and ribbons are worn with uniform in the same manner as the strictly war decorations.

The medals, struck from coin gold or silver, are beautiful examples of the medalist's art and are highly prized as the tribute paid by the nation to individual courage and heroism on the sea.

THE DISTINGUISHED SERVICE CROSS

Under date of January 12, 1918, the President authorized the award of two decorations and two insignia for service in the present world war, the decorations being the distinguished service cross and the distinguished service medal, and the insignia being war-service chevrons and wound chevrons.

The distinguished service cross is of bronze surcharged with an American spread eagle, suspended by a ribbon of dark blue, with narrow stripes of blue and white at each edge. The first hundred of these decorations which were struck had the arms of the cross decorated with oak leaves, but in subsequent ones the leaves were omitted and the cross made plain. The cross is

" awarded by the President, or in the name of the President, by the commanding general of the American Expeditionary Forces in Europe to any person who, while serving in any capacity with the army, shall hereafter distinguish himself or herself, or who, since April 6, 1917, has distinguished himself or herself by extraordinary heroism in connection with military operations against an armed enemy of the United States under circumstances which do not justify the award of the medal of honor."

THE DISTINGUISHED SERVICE MEDAL, U. S. ARMY

This decoration is a bronze medal bearing upon the obverse the coat of arms of the United States. Its distinctive ribbon has a wide band of white through the center with bands of red on each edge separated from the central white band by narrow stripes of blue.

The medal is " awarded by the President to any person who, while serving in any capacity with the army, shall hereafter distinguish himself or herself, or who, since April 6, 1917, has distinguished himself or herself by exceptionally meritorious service to the government in a duty of great responsibility in time of war or in connection with military operations against an armed enemy of the United States."

While the medal of honor still ranks as the highest decoration bestowed by our government, the distinguished service cross comes next in order of importance and is only bestowed for extraordinary heroism displayed in operations against an armed enemy in the field. The distinguished service medal, however, may be bestowed for exceptionally meritorious service to the government either in the field or at any other post of duty. Both decorations may be awarded to women serving with the army in any capacity, as hospital nurses, ambulance drivers, telegraph operators and the authorized Red Cross workers.

Only one distinguished service cross or distinguished service medal is awarded to any one person, but in case a person who has already received one of these decorations is cited in War Department orders for further acts that would warrant the award of either decoration he is awarded a bronze oak leaf to be worn upon the ribbon of the cross or medal. If the citation for heroism or gallantry is made in orders from a general officer's headquarters,

a silver star is awarded, to be worn on the ribbon of the cross or medal.

The order of the War Department announcing the authorization of the distinguished service cross and the distinguished service medal states that they "may be awarded posthumously to persons killed in the performance of acts meriting such award or to persons whose death from any cause may have occurred prior to such award. The medal so awarded will be issued to the nearest relative of the deceased person."

THE NEW NAVY MEDAL OF HONOR

By an act of Congress, approved by the President in February, 1919, "the President of the United States is authorized to present, in the name of Congress, a medal of honor to any person who, while in the naval service of the United States, shall, in action involving actual conflict with the enemy, distinguish himself conspicuously by gallantry and intrepidity at the risk of his life above and beyond the call of duty and without detriment to the mission of his command or the command to which attached."

This same act of Congress also authorized a distinguished service medal and a navy cross for the naval service, corresponding to the distinguished service medal and distinguished service cross already authorized for the army.

THE NAVY DISTINGUISHED SERVICE MEDAL

By the terms of the law this medal is to be presented by the President, but not in the name of Congress, to any one in the naval service who, since the 6th day of April, 1917, has distinguished himself by exceptionally meritorious service to the government in a duty of great responsibility, or who may hereafter so distinguish himself. This medal may be presented to persons in the naval services of our allies under the same circumstances as to those of our own service. It is to consist of a medal of appropriate design suspended from a distinctive ribbon, with a rosette or other appropriate device to be worn in lieu of the medal.

THE NAVY CROSS

The law authorizes the President to present, but not in the name of Congress, the navy cross to any one in the naval service

who, since the 6th of April, 1917, has distinguished or who shall hereafter distinguish himself by extraordinary heroism or by distinguished service in the line of his profession, in cases where such heroism or distinguished service is not of a character to justify the award of the medal of honor or the distinguished service medal. The cross is to be suspended from a distinctive ribbon, and a rosette or other appropriate device is to be provided to be worn in lieu of the cross.

The law also provides that any enlisted or enrolled person to whom a medal of honor, a distinguished service medal or a navy cross is awarded shall receive $2 per month additional pay for each such award; and that in case of further acts deemed worthy of the medal of honor, the distinguished service medal or the navy cross, a suitable bar or other emblem or insignia to be worn with the decoration.

WAR SERVICE CHEVRONS

By order of the President, war service chevrons are prescribed consisting of a V-shaped bar of gold braid one-quarter of an inch in width with each arm two inches long. One of these chevrons is worn by each officer and enlisted man or woman of the army for each period of six months service with the American Expeditionary Force in France, the chevrons being worn on the lower half of the left sleeve of all uniform coats, points down. A similar chevron of blue cloth is provided for similar service for a period of less than six months; and for service other than with the American Expeditionary Force in France a silver chevron is authorized for each period of six months service.

For active service in the fleet during the present war officers and enlisted men of the navy and marine corps are authorized to wear gold chevrons on the left sleeve of all uniform coats, the chevrons being similar to those prescribed for the army, except that in the navy they are worn with the points up.

WOUND CHEVRONS

The same order which authorized the war service chevrons provided for a chevron of the same description to be worn upon the lower half of the right sleeve by each officer and enlisted man who has received or may hereafter receive a wound during action with an enemy which necessitates treatment by a medical officer,

GREAT BRITAIN—VICTORIA CROSS

GREAT BRITAIN—DISTINGUISHED SERVICE ORDER

BELGIUM—ORDER OF LEOPOLD

BELGIUM—CROIX DE GUERRE

FRANCE—LEGION OF HONOR

FRANCE—MEDAILLE MILITAIRE

FRANCE—CROIX DE GUERRE

ITALY—ORDER OF ST. MAURICE
AND ST. LAZARUS

including disablement by gas attack. Additional chevrons are authorized for additional wounds, but in case of two or more wounds received at the same time but one chevron is worn. Wound chevrons are also issued to women serving with the army.

Target Practice Medals and Badges

In the United States services the importance of training at target firing both with small-arms and great guns has ever been kept in view and every effort has been exerted to reach the highest state of proficiency.

The officers and men firing the prescribed courses are arranged into classes according to the degree of proficiency attained, and to those in the higher classes medals and badges are awarded, and, in the case of enlisted men, increases of pay are granted.

While not strictly war medals, these medals and badges for excellence in marksmanship have received the sanction of Congress, and the regulations prescribe that they be worn with uniforms in the same manner as the decorations for gallantry and service in battles and campaigns.

The marksmanship badges for the army and the marine corps are the same in design and include, for rifle firing, the expert rifleman badge, the sharpshooter badge and the marksman badge, and for pistol firing, the pistol expert badge, all of silver; the distinguished marksman, gold medal; and gold and silver medals for departmental and division competition matches.

The marksmanship rewards for the navy include the sharpshooter bronze medal and the expert pistol silver bar.

Various medals and badges awarded by the National Rifle Association to the winners in the matches held under their cognizance are also authorized to be worn by officers and enlisted men of the army, navy and marine corps.

FOREIGN DECORATIONS

Clause 8 of section 9 of Article I of the Constitution of the United States prohibits any person holding a position of profit or trust under the government from accepting a medal or decoration from any foreign government without the consent of the Congress. By the terms of a recent joint resolution of Congress permission is granted for any officer or enlisted man of the military or naval forces of the United States to accept and wear any

decoration or medal bestowed upon him by any of the nations concurrently engaged with the United States in the present war, the permission for such acceptance to extend until one year after the close of the war. The resolution also authorizes the President to confer upon the officers and enlisted men of our allies in the war any of the medals or decorations authorized for our own military or naval services.

The decorations which the President may confer upon the officers and men of our allies include the medal of honor for the army, the medal of honor for the navy, the distinguished service cross, the navy cross and the distinguished service medals.

The decorations and medals which the governments of our allies may confer upon the officers and men of our military and naval forces include: For France, the Cross of the *Legion d'honneur* (Legion of Honor), the *Medaille Militaire* (Military Medal) and the *Croix de Guerre* (War Cross); for Great Britain, the Military Cross, the Distinguished Conduct Medal and the Military Medal for the land forces, and the Distinguished Service Cross, the Conspicuous Gallantry Medal and the Distinguished Service Medal for the naval forces; for Belgium, the Military Cross, the War Cross and the Queen Elizabeth Medal; for Italy, the Medal for Military Valor; for Servia, the Medal for Bravery and the Medal for Military Merit.

There are also numerous orders of knighthood which may be conferred by monarchies and kingdoms upon certain of their own subjects and upon citizens of other countries as well, but, although frequently conferred upon great military and naval leaders, the stars of these orders are not, properly speaking, war decorations.

FRENCH WAR DECORATIONS

The Legion of Honor was inaugurated by Napoleon I at Les Invalides, on July 15, 1804, the 15th anniversary of the taking of the Bastille, the purpose being to reward distinguished services to the state, both military and civil. In its original form the cross was a white enameled gold cross with five double-pointed rays tipped with silver balls, resting upon a green enamel wreath of oak and laurel, surcharged with a central medallion bearing the head of Napoleon, surrounded by the words, "Napoleon Empereur des Francais." The cross was suspended by a crown and a red ribbon. The present cross has on the central medallion

a female head representing the republic, surrounded by the inscription, "Republique Francaise, 1870," and a wreath of green enamel instead of the crown.

The Medaille Militaire (Military Medal) was established in 1852 by Prince Louis Napoleon. It is awarded to general officers in command of armies, flag officers in command of fleets or squadrons and to non-commissioned officers and men who especially distinguish themselves by courage in action. The medal consists of a silver gilt head of the republic, surrounded by a circlet of blue enamel bearing the inscription, "Republique Francaise, 1870," enclosed in a silver wreath of laurel leaves, and surmounted by a trophy of arms in silver. It is suspended by a ribbon of orange edged with green.

This medal is the one worn by Marshal Joffre during his recent visit to the United States.

The *Croix de Guerre* (War Cross), a distinctive decoration of the present war, was founded by law on April 8, 1915, to be conferred upon all persons, whether military or civilian, who are mentioned in the order of the day for deeds of great valor during the war against Germany and her allies. It is a four-armed cross pattée of Florentine bronze, with two crossed swords between the arms, with a central medallion bearing the head of the republic, surrounded by the inscription, "Republique Francaise." On the reverse are the dates, "1914-1915." The ribbon is green with red edges and five narrow red stripes.

If the citation for which it was awarded was in orders from army headquarters the ribbon bears a bronze palm leaf (*palme en bronze*); if from the headquarters of an army corps, a gilt star; if from a divisional headquarters a silver star; and if from the headquarters of a brigade or regiment, it bears a bronze star.

BRITISH WAR DECORATIONS

The Victoria Cross is considered to be the highest decoration conferred by the British Government upon the officers and men of the naval and military forces of Great Britain. It was established by Queen Victoria during the Crimean War to reward individual officers and men of the British Navy and Army for signal acts of gallantry, courage and devotion under the fire of an enemy. To win this rare reward the act of gallantry must be one over and above the requirements of duty as laid down in regulations and orders.

The V. C. has never been conferred upon any one except officers and men of the British land and sea forces, including regulars, volunteers, reserves, colonial forces, auxiliaries and persons serving in some capacity with the forces. It takes precedence over all other decorations and medals and whenever it is possible to do it is personally pinned upon the breast of the recipient by the king.

The decoration consists of a bronze cross pattée suspended from a bronze bar by a link made in the shape of the letter "V," for Victoria. On the center of the obverse is a royal crown with a lion passant gardant standing upon it and a semicircular scroll surrounding it upon which is the inscription, "For Valour." Upon the reverse, which is plain, is engraved the date of the act for which the cross was awarded. The name and rank and the ship or regiment of the recipient is engraved upon the back of the bar from which it is suspended.

The ribbon is blue for the navy and red for the army, and in the very rare cases where the reward has been given for a second act deemed worthy of the V. C. a bar is attached to the ribbon.

The Military Cross is a distinctive decoration of the present war, having been established on December 31, 1914, to reward captains, lieutenants and warrant officers of the land forces for conspicuous service in the war who have been recommended for the honor by the Secretary of State for War. It is of silver and bears in the center the imperial cypher "G. R. I.," and upon each arm an imperial crown. The ribbon is white, purple, white, in stripes of equal width.

The Distinguished Service Cross was established in 1901 to reward warrant officers, midshipmen, naval cadets and clerks of the British Navy for distinguished service before the enemy, under the name of the Conspicuous Service Cross. In October, 1914, the name of the decoration was changed to the Distinguished Service Cross and it was ordered that it should be awarded to officers of the navy and marine below the rank of lieutenant commander or major, thus making it correspond to the Military Cross for the land forces.

It is a four-armed silver cross with the arms convexed, bearing upon the obverse enclosed in a circular rim the imperial cypher, "G. R. I.," surmounted by an imperial crown. The ribbon is blue, white, blue, in stripes of equal width.

ITALY—ORDER OF THE CROWN

ITALY—MILITARY ORDER OF SAVOY

SERBIA—ORDER OF KARAGEORGE

SERBIA—ORDER OF THE WHITE EAGLE

JAPAN—ORDER OF THE RISING SUN

PORTUGAL—ORDER OF ST. JAMES
OF THE SWORD

RUSSIA

GERMANY—IRON CROSS

AUSTRIA—ORDER OF FRANZ JOSEPH

BULGARIA—ORDER OF ST. ALEXANDER

TURKEY—ORDER OF MEDJIDIE

The Distinguished Conduct Medal was established in 1854 by Queen Victoria to reward non-commissioned officers and privates of the army " for distinguished conduct in the field." This medal, usually known as the D. C. M., is of silver suspended from an ornamental scroll clasp. On the obverse is the head of the reigning sovereign and on the reverse the legend, " For distinguished conduct in the field." The ribbon is red, blue, red, in stripes of equal width.

The Conspicuous Gallantry Medal was originally authorized during the Crimean war and again in 1874 to reward petty officers and men of the navy and non-commissioned officers and privates of the marines for conspicuous gallantry in action. It corresponds to the Distinguished Conduct Medal for the army. The medal is of silver and bears on the obverse the head of the reigning sovereign and on the reverse the legend, " For conspicuous gallantry," surrounded by a wreath and surmounted by a crown. The ribbon is blue, white, blue, in stripes of equal width.

The Military Medal was sanctioned by King George V in March, 1916, to reward non-commissioned officers and men of the army who have been recommended by the commanding general in the field for acts of bravery. It is a silver medal with the effigy of the king on the obverse and the inscription, " For bravery in the field," surrounded by a wreath surmounted by a crown, on the reverse. The ribbon is dark blue with five narrow stripes through the center, two red and three white.

The Distinguished Service Medal, established in October, 1914, is awarded to petty officers and men of the navy and to non-commissioned officers and privates of the marines " who show themselves to the fore in action and set an example of bravery under fire." It corresponds to the Military Medal for the army. It is a silver medal, bearing on the obverse the bust of King George V in the uniform of an admiral and on the reverse the legend, " For distinguished service," surrounded by a wreath and surmounted by a crown. The ribbon is blue with two narrow white stripes through the center.

BELGIAN WAR DECORATIONS

The Belgian War Cross was established on October 25, 1915, as a decoration to reward all persons who have been mentioned in

general orders for individual acts of courage, devotion or valor during the war against Germany and her allies. The war cross is of bronze and is modelled after the French *Croix de Guerre.*

The Queen Elizabeth Medal was authorized in September, 1916, to reward those who have devoted themselves to war work, such as succoring the wounded, aiding refugees and fugitives and maintaining canteens and rest stations for the soldiers at the front. The medal is awarded in the name of the popular queen of Belgium to men and women, both Belgian and foreign, who are deemed worthy of it.

The Military Medal was instituted by royal decree on September 15, 1902, to reward "soldiers of all ranks below that of a commissioned officer who, by their conduct and service, have merited special distinction."

ITALIAN WAR DECORATIONS

Italy has established no new decorations for war service during the present war, but when she entered the war in 1915 she had four orders which might be conferred upon officers of certain classes, and had awarded numerous medals for service in past wars.

The Medal for Military Valor is awarded to officers and men of the Italian army and navy for conspicuous acts of gallantry and courage in the face of the enemy. The medal is awarded in three classes, of gold, silver or bronze, according to the class of the service. The gold medal has almost always been awarded for a deed of heroism and daring which has resulted in the death of the soldier or sailor performing the deed and it is regarded as the highest tribute to bravery which Italy can pay.

The silver and bronze medals are awarded for gallant deeds under fire, and as one medal is awarded for each act meriting the reward, it is not uncommon to see an officer or soldier with two such medals.

The ribbon of the medal is blue.

All officers and men of the Italian army who have served one year at the Austrian front are authorized to wear a ribbon of the national colors, green, white, red, in the same manner as the ribbons of medals and decorations are worn; and those who have served a year on the fronts in Macedonia and Albania are authorized to wear a red and white ribbon.

Serbian War Decorations

The most highly prized war decoration of Servia is the Medal for Bravery, established in 1885. It is made of gold for the first class and of silver for the second class. The gold medal of the first class is awarded to officers for deeds of great bravery in the face of the enemy and very rarely to non-commissioned officers for deeds of extreme daring and courage performed after all the officers present had been killed. The silver medal of the second class is awarded to non-commissioned officers and privates for deeds of especial bravery in action.

The obverse bears the head of the great national hero of Servia, Miloch Obilitch, who in 1389 at the battle of Kossova defeated the Turks, killing their leader, the Sultan Murad, with his own sword. The reverse bears the legend, "For bravery." The ribbon is blue.

The Medal for Military Merit was authorized by the king in 1883 to reward officers and men of the army for meritorious service in peace or war. The medal is of gold for the first class, awarded to officers, and of silver for the second class, awarded to non-commissioned officers and privates.

On the obverse is the crown of Servia and on the reverse the legend, "For Military Merit." The ribbon is blue and white.

Thus it will be seen that the bits of metal and the strips of multicolored ribbon that adorn the breast of our soldiers and sailors are not meaningless baubles chosen to satisfy a passing fancy. Each one marks some gallant deed on the bloody field of battle or wind-swept sea, some duty for the country well done or some years of faithful service under the flag in the ceaseless struggle to insure "that government of the people, by the people, for the people, shall not perish from the earth."

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

NAVAL APPROPRIATIONS

By CAPTAIN CHARLES CONARD, P. C., U. S. Navy

INTRODUCTORY

The appropriation system of the Navy Department constitutes a handicap against the uniform advance in industrial and administrative methods which has been and is being made from year to year. As military efficiency is of course affected by the degree of progress made in the industrial and administrative branches, it is important to remedy any defects known to exist therein.

It is unnecessary to say that this condition has been commented on from time to time. Two references only will be made.

Admiral McGowan in his report as paymaster general for the fiscal year 1915, said:

> In addition to interfering with the proper distribution of costs, the present complicated method of making appropriations entails a great volume of unnecessary paper work and a mass of bookkeeping detail, the disadvantages of which are felt throughout the naval establishment.

Admiral Cowie in a lecture before the Naval War College, September 3, 1915, said:

> The naval appropriations at the present time are very complex, and many of them carry identical clauses. Their consolidation would simplify all business transactions connected with purchases, permit more accurate cost accounting, facilitate the reporting of expenditures and result in an economical distribution of funds by administrative authority at the time the necessity for a particular expenditure becomes apparent.

The navy is in the fortunate position of not having to make any excuses for failure to produce. A request made to Congress to relieve us of the burden of the unsatisfactory appropriation methods cannot, therefore, be ascribed to weakness, but rather to a strength born of overcoming difficulties.

In the following article, it is first shown that the navy has made considerable progress in getting around the obstruction of the appropriation system. But we still carry the deadweight of it,

and an attempt is made to indicate how it can be removed from our path without causing any disorganization of our work.

There never was a better time than the present for settling this problem.

The financial, or fiscal, system of the Navy Department runs so smoothly and has so well withstood the strain of the present war, that few outside of those in immediate touch with the details of the problem appreciate the difficulties which have been overcome in the past, or those which still remain to be cleared up. The navy methods for obtaining and handling funds and stores are believed to be superior to those of most other departments of the government; certainly when comparison is confined to the long-established executive departments, where old traditions and inherited systems tend to complicate the routine. Some of the recently instituted departments have undoubtedly been able to start with systems untrammeled by ancient customs, and should therefore be better off in this respect than the older institutions.

In order to obtain a clear idea of the present navy methods, it will be well to describe briefly how money is obtained and handled, and then to glance back over the changes which have been introduced in late years.

To obtain funds for a coming fiscal year estimates from the bureaus, based on reports from the various yards and stations, are submitted to the Secretary, gone over carefully and forwarded to the Secretary of the Treasury for transmission to Congress. These estimates are divided under headings, called appropriations, in accordance with the purposes for which the money is desired. Each bureau has its own group of appropriations, the titles of which indicate more or less closely the ultimate objects of expenditures. However, as the result of long custom, the titles of some appropriations give only a broad indication of the nature of the proposed expenditures, and in that case there is added a somewhat detailed wording intended to specify or describe in a general way the kinds of charges which are to be met under that appropriation. It must be remembered that formerly each bureau maintained a kind of independence, not only as an administrative section of the Navy Department, but also as a managing element of the yards and stations. Consequently, each bureau sought to incorporate in the appropriation bills word-

ing to indicate its functions and to tighten its control over the matters in which it was interested. From time to time new activities were taken up and mentioned in succeeding appropriation bills, while more or less obsolete details were still retained, or eliminated only after considerable time. Thus the main or leading appropriations of the several bureaus contain descriptive wording which attempts to delimitate, in a certain degree, the functions of the bureaus, and which, from the manner in which this wording has been compiled, is unscientific and unsatisfactory.

In addition to the main appropriation of each bureau, other appropriations more specific in their nature are included in the bill. In many cases the objects of expenditures mentioned in these specific appropriations are also covered in general terms by the main appropriations, so that often payments can be made either from the bureau's main appropriation or from one or more of the specific appropriations.

Congress having gone over the estimates submitted, the appropriation bill is finally enacted into law. The final figures of the bill are reached only after careful inquiry by the Congressional committees, the Secretary, bureau chiefs, and others concerned appearing before these committees and explaining the needs of the service in detail. After the bill is passed and signed by the President, it is carried to the treasury books, and the money becomes available for use. On the treasury books the sums appropriated are recorded under the names of the several hundred appropriations mentioned in the act, and from that point on a credit and debit account is maintained for each individual appropriation covered by the bill. The same procedure is followed in the Bureau of Supplies and Accounts.

With the exception of the Navy Department, for reasons to be explained below, the general practice of the government when funds are to be drawn from the treasury, is to specify the particular appropriation concerned for each intended payment. Thus a disbursing officer having 20 payments to make, each under a different appropriation, must procure the amounts necessary under 20 different accounts, and must keep each one of these appropriation accounts separate and distinct from all the rest. The fact that he may have ample funds under other appropriation accounts would not permit him to make payment of any one of these 20 bills until new funds were obtained from the treasury

properly "ear marked" for the purposes intended. For a long time the Navy Department carried out this involved and laborious routine in common with other departments of the government. Delays in payments were frequent, as it was necessary to secure the funds for each voucher by means of requisitions, via the Secretary of the Navy and Secretary of the Treasury, culminating in warrants on the treasury under which the money was placed to the disbursing officer's account.

A necessary modification had been made, however, in the cases of naval vessels. It is evident that ships in all parts of the world could not procure funds in the manner above described, and consequently a practice had grown up of making payments of all kinds from "Pay of the Navy" and afterwards adjusting between that and the appropriations actually concerned.

In 1878 a modification of the law was obtained as follows:

> That the Secretary of the Navy be, and he is hereby, authorized to issue his requisitions for advances to disbursing officers and agents of the navy under a "General Account of Advances" not to exceed the total appropriation for the navy, the amount so advanced to be exclusively used to pay current obligations upon proper vouchers and that "Pay of the Navy" shall hereafter be used only for its legitimate purpose, as provided by law. (20 Stat. 167.)

From then on supply officers of vessels and on foreign stations obtained funds under "General Account of Advances." The appropriations chargeable with expenditures were shown on statements accompanying "Accounts Current," and the treasury made the necessary adjustments when the accounts were received. This practice was confined, however, almost entirely to ships and foreign stations, although it became customary to place in the hands of the disbursing officers in the United States small amounts under "General Account of Advances" to be used by them in emergency cases. When so used, however, the disbursing officer promptly forwarded a requisition for funds under the appropriation concerned to cover the payment in question, thus maintaining a complete balance under each appropriation of receipts and expenditures.

In 1907 authority was obtained from the Treasury Department to utilize the law of June 19, 1878 (quoted above), for all payments made by the navy. The system of withdrawing money from the treasury under the names of the multitude of appropriations was completely discarded, and thereafter each disbursing

officer was, and is now, supplied with funds entirely under "General Account of Advances." The plan adopted for home stations is simple and efficient. Each disbursing officer is charged with a fixed sum, the amount of which is based on his probable needs. He reports his expenditures periodically (daily, weekly or monthly, according to the size of the office) and is reimbursed with the amounts actually expended, so that an even flow of funds is maintained to his credit, to offset the expenditures actually made. The charges to the various appropriations are made in the Bureau of Supplies and Accounts and in the Treasury Department in accordance with the vouchers submitted by the disbursing officers, "General Account of Advances" being credited at the same time that each appropriation is charged.

A similar method of procedure has been adopted for stores. Formerly all materials were bought under the individual appropriations and held in store in separate lots until used. Where the need arose to use for the purposes of one appropriation stores which had been purchased under another appropriation, it was necessary to effect a transfer between the two appropriations concerned, involving much bookkeeping and paper work. Various regulations were adopted relative to the common use of stock which had been procured in previous fiscal years, but the system was one which led to endless confusion and argument. Congress was induced to appropriate money for the establishment of a "Naval Supply Fund" to be used for purchasing stores for general use. When these stores were used, the values were credited to the fund, and corresponding charges were made to the appropriations under which the materials were utilized. A "revolving fund" was thus maintained. The principle was recognized as being sound and efficient, but the amount of the fund, $2,700,000 was insufficient. Finally the matter was settled by turning all balances of stock into the common fund (excepting certain technical and special articles) and establishing a section of the "General Account of Advances" known as the "Naval Supply Account." At present stock is purchased and held under "General Account of Advances, Naval Supply Account" until used, whereupon the values are credited to this intermediate account, and the appropriation charged.

This brief description has been given in order to indicate our present status and to show the improvements which we have

already made. It is believed that had we not been able to carry on our business in the straightforward and direct methods described, we would have had immense difficulty in meeting the emergency caused by the war. The procuring of money and stores under a multitude of appropriations, the maintaining of stocks in separate lots, and the constant transferring from one to another which would have been necessary would have led to endless confusion. Doubtless the Gordian knot would have been cut in some fashion, and business would have proceeded, but never in the smooth and orderly way of which we have reason to feel proud. Nor could the same efficient results have been obtained.

Thus the navy, by successive steps, has made considerable progress in the direction of simplicity and consolidation of its fiscal methods, and it is believed that the great advantages derived thereby are evident without extended argument in explanation. There remains, however, one great obstacle to the perfection of thoroughly business-like methods, and that is the appropriation system itself. It will be observed that the progress thus far made, and described in the preceding paragraphs, has been mainly along the line of overcoming difficulties inherent in the appropriation problem. Funds and stores are secured through an intermediate account, and charged back to the appropriations when used, avoiding the delay and complication which would be involved in dealing with separate lots for each appropriation *ab initio*. But this by no means settles all the difficulties surrounding this subject. There still remains the considerable task of correctly assigning to each appropriation its proper total of charges due to work done and activities carried on. Were the appropriations laid out in a simple and easily comprehensible system, based on the objects of usual and actual expenditures, instead of being the result of traditional methods modified by additions and subtractions in recent years, the problem would be simpler. Nevertheless, the multiple appropriation system, even though improved as suggested, would continue to offer a bar to reasonable and proper accounting. Before illustrating this point, an attempt will be made to show the existing difficulties.

As has already been stated, each bureau of the Navy Department has a group of appropriations under its immediate cognizance, consisting generally in each case of a main or leading appropriation, supplemented by a number of more or less specific

amounts appropriated for particular purposes. In addition, the bureaus are interested in other appropriations which might be indicated as for the navy as a whole, such as for the increase of the Navy, emergency fund, aviation, etc. In these latter cases, the amounts to be spent under each bureau are not stated, it being left to the Secretary to allot proper amounts to each bureau interested.

Under what has been called the "leading appropriation" of each bureau, practically any expenditure made by that bureau could be located. The supplemental appropriations are usually merely additional sums for specific objects, also covered generally by the leading appropriation. Under Treasury Department rulings, where there is an appropriation covering in specific terms a proposed expenditure, such expenditure cannot be charged to another appropriation, also covering in general terms the same object, although in the absence of the specific appropriation the general appropriation could have been used. It has not been found possible however to adhere strictly to this ruling, in the case of naval appropriations. Cases frequently arise in which expenditures might be located to one appropriation, but for various reasons are charged to another. In fact, it is so customary to distribute charges in accordance with the convenience of the bureau or bureaus concerned that such action has become a routine matter. Certain classes of expenditure are customarily charged to a given appropriation, another class to a second appropriation, and so on. While it is true that possibly a majority of all charges must by their nature each be charged to one, and only one, appropriation, there remains a respectable minority which can be located to this or that appropriation, and the decision as to where to locate the charge is made from motives of policy, or after consideration of the available balances under the appropriations concerned.

A few years ago the Navy Department issued a general order instituting a new system of official correspondence. To make clear the application of the new methods, sample letters with endorsements were incorporated in the order, and as it was desirable to use typical cases familiar to the service generally, the subject of the correspondence in one case was made to relate to a proposed extension of navy yard facilities, where the main question involved was what appropriation should be used. This

is found in the naval instructions of to-day, and illustrates pretty well our attitude of mind in regard to the distinctions between appropriations.

As a matter of fact, the question of which appropriation to use for a given piece of work is one that is constantly arising, and is not only a serious difficulty, but usually causes a vexatious loss of time. A recent example is as follows:

The supply officer at a navy yard having worked out, in conjunction with the Public Works Department, a plan for the installation of certain sand unloading machinery, correspondence took place, of which the following is an abstract:

(a) The public works officer states that his department has no funds available for the equipment. That it is portable equipment similar to other kinds, the property of the storehouse. Requests information as to whether supply officer concurs, as further action is dependent upon determining which bureau shall pay for the equipment.

(b) Supply officer considers the installation properly chargeable against a public works appropriation.

(c) Public works officer does not consider argument used by supply officer as sound; furthermore, as prospect of obtaining funds for project from Bureau of Yards and Docks is not bright, suggests that supply officer take such steps as are practicable towards purchasing the equipment.

(d) Commandant approves.

(e) Supply officer submits requisition under "Maintenance, Supplies and Accounts."

(f) Bureau of Ordnance returns requisition, as not chargeable to appropriation indicated. States that it appears to be chargeable to appropriation "Naval Gun Factory Tool and Machine Plants."

This correspondence consumed over two months. A perfectly conscientious effort was made by all concerned to properly locate this charge. It will be noted, however, that the problem was to determine the *source* from which the funds were to be obtained. The proper head under which to record the expenditures when made, that is, the expense classification, was not even considered. The accounting system will handle that phase of the matter with ease, no matter what appropriation supplies the funds.

The naval accounting system has recognized that an accurate statement of purposes for which money has been expended is essential, the mere record of the amount expended from each appropriation being insufficient. Each expenditure is therefore located under one of the main "titles" of the naval establishment, descriptive of the purpose for which the money was used. Thus,

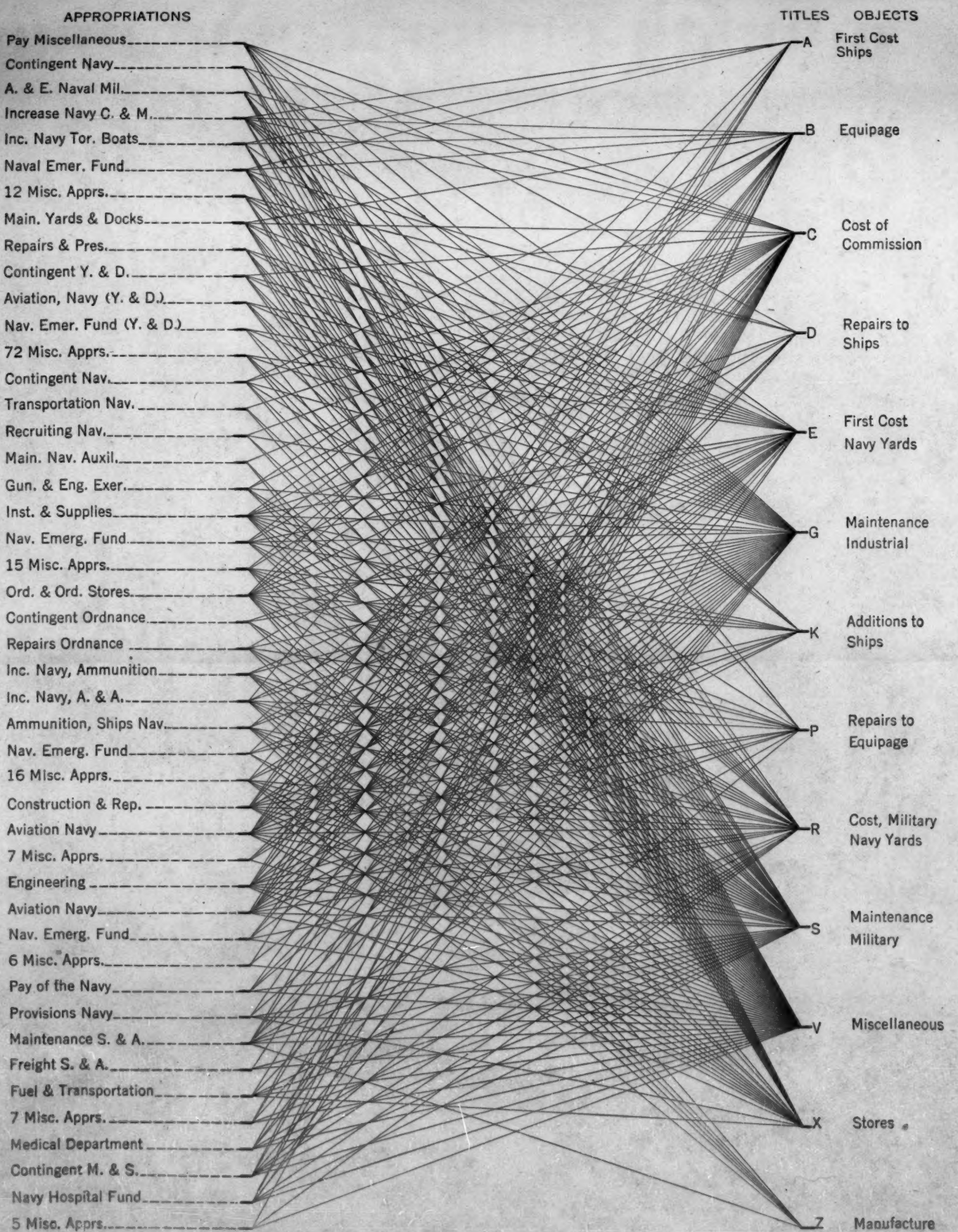

DIAGRAM SHOWING DISTRIBUTION OF NAVAL APPROPRIATIONS TO OBJECTS OF EXPENDITURE

every appropriation is dissected according to these titles. It might be thought that one appropriation would naturally be expendable under one title, and so on. To show how far from the truth such a view is, a diagram has been drawn, in which the appropriations for the fiscal year 1917 are listed and connected by lines to the various objects of expenditure, or titles. It was found impracticable to list all the appropriations, on account of the great number of them, so the diagram includes only the most important ones by name, arranged or grouped under each bureau. The number of the remaining ones not named is also stated in each case, and all titles which pertain to these appropriations are indicated by connecting lines.

It is believed that the diagram gives a better idea of the interweaving and complication of the appropriation system than could be described by pages of writing. The fact that every title, or object of expenditure, draws funds from a great number of appropriations is clearly brought out. In other words, although there are such a great number of different sums appropriated, the objects of expenditure are relatively few, and consequently it would seem more reasonable, if separate appropriations for particular purposes are to be made, that at least but one appropriation be allowed for each purpose.

However, this does not really carry us to the root of the matter. The point to be most carefully noted in this connection is that exclusive of sums allowed for specific work, such as items under "public works," the amounts which we carry on our books as appropriations are in fact *merely the final approved estimates of the sums* which will be needed during the ensuing fiscal year for the various purposes of the naval establishment. When we solidify these estimates into fixed sums, as though we had plans and specifications for definite work ahead, we become involved in many difficulties in the practical carrying on of affairs. Especially is this true under existing conditions where the terms of many of the "appropriations" are vague and incomprehensive, and where so much overlapping exists as to the possible objects of expenditure. Let us examine for a moment the regular course of procedure in expending the sums appropriated for the navy. As we have seen, each bureau, at the beginning of a fiscal year, has at its disposal a group of appropriations to be used in carrying on the work in which such bureau is interested. The money must be so apportioned amongst the various yards, ships etc., that each month the

expenditures must average the correct proportion of the totals available, due regard being had to the character of the demands arising. Every effort is made to avoid obligations which will result in the overexpenditure of any given appropriation. Consequently, when it is seen that the monthly demands on such an appropriation are running ahead of the allotted sums, costs which would otherwise be charged to this appropriation are located under other appropriations which, as has been explained in preceding paragraphs, are also chargeable with such expenditures. Attention is largely concentrated on keeping accurate records showing the available balances of the *sources* of funds (*i. e.*, the appropriations), rather than on clearly showing the exact objects for which sums are expended. It is true that the objects of expenditure are faithfully recorded through the cost accounting system, but their importance is diminished owing to the interest in the appropriation accounting.

The acounting instructions, in treating of this matter at some length, conclude as follows:

> Appropriation charges show the source or legal authorization for the expenditure of the various sums of money devoted to output and maintenance. Cost charges show the disposition of the money, the final resting place of values. The two classifications are independent and cannot be made identical without impairing the legality of one or the correctness and administrative value of the other. The cost of an item of output cannot be correctly determined except by taking into consideration the elements thereof contributed by numerous appropriations.

Now the bureaus concerned, being mainly interested in the charges to their appropriations, do not follow with equal attention the question of costs under the various expenditure heads, especially since those accumulated costs affect a variety of appropriations with many of which a given bureau is not concerned. A glance at the diagram gives some idea of the extent to which this diffusion of sources is carried. It does not tell the whole story, however, as it does not bring out the facts relating to individual pieces of work, or jobs. Not only is it true that several appropriations have charged to them jobs of similar nature, but also it is necessary that the cost of any single job be made up of charges from a variety of appropriations. The resulting complexity is obvious.

Imagine an industrial plant which, in additon to the usual plan of exhibiting its receipts and expenditures in all the detail necessary to give a clear and comprehensive understanding of

the business conducted, including a complete cost system, also endeavored to show how every element of income was distributed, tracing each sum received in such a way as to indicate the final disposition of every sum throughout the multiplication of bookkeeping details. Such a plant might then be in position to answer a question like this: "You have spent $10,000 for repairs to buildings. Where did you get the money?" The answer would be: "The sum spent for repairs to buildings was obtained thus: Sales to Wm. Smith & Co., $43.10, interest on investments $7.42, merchandise account $8421, royalties account $3.02, and so on through a list of receipts. Such a system would be well-nigh impossible and perfectly useless. It would, however, be closely similar to our naval appropriation cost accounting system, where actually more attention is given to following the status and distribution of the *sources* of supply (the appropriations) than to the objects of expenditure.

To improve conditions the first step would be to have *all estimates submitted under the same headings as those used for the final expenditures themselves.* In this connection the following is quoted from the conference on accounting, June, 1914:

> It will not be possible to put into effect an entirely suitable and satisfactory system until the methods and classifications used in submitting estimates to Congress and the wording of appropriation bills are correspondingly modified and revised so that all estimating, appropriating accounting instructions are harmonized and so that identical terms, classifications and meanings will exist throughout.

However, even were estimates submitted under the logical headings provided by the accounting system, if these estimates after approval were embodied into appropriations, as the present estimates are, the situation would be only slightly improved. There would still remain the fact that several distinct sources of supply of funds have to be entered on the treasury books, and that complications would exist due to the necessity of tracing each source to its final disposition, as well as analyzing each expenditure head, to show whether two or more appropriations were involved. *The real cure for our troubles is to let estimates remain estimates and not to convert them into separate and distinct appropriations at all, except that the total of all estimates would make the total of the Naval Appropriation Act.*

Is any advantage, in the way of strict accountability or accurate information to Congress, gained by the present system of

many appropriations? To answer intelligently, let us examine the relations existing between the Navy Department and the Treasury Department and Congress, in regard to these appropriations.

The Treasury Department is charged with the duty of determining whether or not any given voucher covering expenditures of funds by the Navy Department is a proper voucher, and if all legal requirements have been complied with. If found correct in that particular the treasury then proceeds to charge up the voucher to the appropriation indicated on its face, provided of course such appropriation is properly chargeable with such an expenditure. There are thus two distinct questions involved in the auditing of a voucher: *First*, is it in legal form? *Second*, is it chargeable to the appropriation named? The treasury is the only authority on the first question, and the Navy Department must conform absolutely to its rulings. As regards the second question, the treasury is necessarily at a loss, for, as has been shown, many appropriations are often chargeable with a given expenditure. The best the treasury can do is to satisfy itself that at least the appropriation inscribed on the voucher is one of those to which such an expenditure *may* be charged. It therefore rests with the Navy Department to keep the record straight in regard to appropriations, and that is what actually takes place. It is true that there is a large class of vouchers each of which by its nature could be charged to only one appropriation, and the treasury can judge of itself in such a case whether or not the correct appropriation has been inscribed. But as there is also a great number of vouchers for which the treasury has to rely on the navy for the correct appropriation classification, the effect is practically to leave the whole decision in the hands of the navy. Consequently, no advantage in the way of accountability is gained by maintaining the system of many appropriations, considering only the relations existing between the navy and treasury.

As regards the relations between the Navy Department and Congress, we find that Congress approves certain estimates, and that in passing the naval bill these estimates are solidified into separate and distinct appropriations. If emergencies later arise which require the expenditure of sums greater than those estimated in certain cases, it becomes necessary to obtain deficiency appropriations from Congress. At the same time other estimates

may be found greater than needed, but no method is available of using overestimates to offset underestimates, except that of shifting charges, to which reference has been made. This method is not to be commended. How much more sensible it would be to definitely recognize that estimates are in fact *only* estimates, and to enact a naval appropriation bill providing for a total amount made up of the sum of the estimates which have been approved by both Houses of Congress, but not making separate and distinct appropriations in the case of each estimate.

Such a bill should be composed of *general* estimates and *specific* estimates. The first would consist of the regular working amounts which have been called the leading appropriations, and also the supplemental amounts for similar purposes; the second would be those sums allowed by Congress for specific projects, such as for public works, and also for amounts allowed for increase of the navy. The second class of estimates would in reality be allotments, the amounts not to be exceeded; while the first class would be expended as nearly as practicable in accordance with the estimates, with proper explanations of all variations. The general estimates, should, however, be made up to cover the objects of expenditure as laid down by the accounting system, accompanied by such text as would be necessary to substantiate the requests; the present indefinite and misleading wording should of course be abandoned.

A good example of what is meant is found in the current appropriation "Pay of the Navy." Here we find a group of separate estimates for a variety of purposes for which the appropriation is to be used, and then the clause, "and the money herein specifically appropriated for 'Pay of the Navy' shall be disbursed and accounted for in accordance with existing law as 'Pay of the Navy' and for that purpose shall constitute one fund." The fact is here recognized that the various estimates are based on probabilities, but that so long as the total is not exceeded, variations from these estimates are permitted.

Another example, not quite so clear, is found under "Ordnance and Ordnance Stores" of the current act, where we find: "*Provided further,* That ordnance materials procured under the various ordnance appropriations shall hereafter be available for issue, to meet the general needs of the naval service, under the appropriation from which procured." The provision has the virtual effect of closing all the ordnance appropriations into

one appropriation, so far as the purchase and use of material is concerned.

An appropriation act passed in the way described above would then be made up of detailed estimates, in which the purpose of each sum would be definitely described. Certain sums would be fixed allotments, not to be exceeded. The others would be simply estimates. The total amount appropriated would then be entered on the treasury books as one sum.

In expending this sum the Treasury Department would continue to exercise its function of passing on the legality of the vouchers submitted. It would make no attempt to classify expenditures under the various estimates. On the other hand, the Navy Department would report to Congress all expenditures made aaginst the corresponding estimates, and would give suitable explanations of all variations made. The estimates and expenditures being made under the same descriptive headings, a complete and satisfactory report would be feasible. Congress would have as much and even more control over the moneys expended than at present, since the best that can now be done is to show on the one hand the expenditures made from the many appropriations, and on the other hand to describe in entirely separate tables the purposes for which money was used.

Another feature should be the cumulation of appropriations from one year to the next, so that there should always be on the treasury books but one appropriation running for current needs. The ordinary practice is to maintain the sums of each fiscal year separate from other fiscal years, and this enormously increases the complexity of accounting. *In each appropriation act the balances remaining from the previous year should be re-appropriated for the ensuing year, and closed in to the new appropriation.* This has already been done in the current appropriation bill, so far as the appropriations for the preceding year are concerned; each distinct appropriation balance being carried forward and credited to its successor. This principle should be carried further, and *all balances should be closed into the one fund.*

It should be evident that the plan proposed differs entirely from the method sometimes designated as that of "lump appropriations," in that detailed estimates are made and finally reported up, which is not true of the usual lump appropriation.

To make clear the plan proposed, the amounts found in the current appropriation act have been rearranged and distributed in

the way they would appear under the new system. Following the usual preamble would appear:

NAVAL ESTABLISHMENT

For all necessary purposes of the naval establishment, except for the Naval Academy and for the marine corps, in accordance with the following approved estimates, $1,412,314,455; *Provided*, That the amount here appropriated shall constitute one fund, and shall be disbursed and accounted for as such. And *Provided further*, That the Secretary of the Navy shall report to Congress the expenditures made for each approved estimate included herein. And *Provided further*, That those estimates marked "Specific" shall in no case be exceeded.

APPROVED ESTIMATES

TITLE A. FIRST COST OF HULL, MACHINERY AND PERMANENT FITTINGS

Specific Torpedo-boat destroyers	$125,000,000
On account of torpedo-boat destroyers heretofore authorized.	
Specific Torpedo-boats	32,397,000
On account of submarine torpedo-boats heretofore authorized.	
Specific Armor	10,000,000
Toward the armor for vessels heretofore authorized.	
	$167,397,000

TITLE B. SHIPS' EQUIPAGE

Specific Armament for new vessels	$10,000,000
Toward the armament for vessels heretofore authorized.	
*New batteries for ships of the navy	85,014,110
For batteries and outfits for naval vessels, auxiliaries, patrols, aircraft, naval stations and merchantmen.	
NOTE: $41,259,523.50 included in this estimate to meet obligations already incurred.	
Torpedoes and appliances	10,000,000
Ordnance equipage in general	3,000,000
Construction and repair equipage	7,000,000
Steam engineering equipage	3,000,000
Supplies and accounts equipage	1,000,000
Navigation equipage	1,000,000
	$120,014,110

*The Secretary of the Navy is authorized to incur obligations not to exceed $20,000,000 in addition to this estimate.

TITLE C. COST OF COMMISSION (MAINTENANCE) OF SHIPS

Under Bureau of Navigation	$1,469,800
Under Bureau of Ordnance, ammunition, etc.	8,000,000
Under Bureau of Construction and Repair supplies	6,000,000
Under Bureau of Steam Engineering, supplies	6,000,000
Under Bureau of Medicine and Surgery, supplies	1,000,000
Under Bureau of Supplies and Accounts, supplies	2,000,000
Provisions	50,000,000
Pay	180,000,000
Fuel	25,000,000
	$279,469,800

TITLE D. REPAIRS TO VESSELS

Under Bureau of Ordnance	$2,000,000
Under Bureau of Construction and Repair	13,000,000
Under Bureau of Steam Engineering	16,000,000
	$31,000,000

TITLE K. ALTERATIONS TO VESSELS

Under Bureau of Ordnance	$3,522,279
Under Bureau of Construction and Repair	12,000,000
Under Bureau of Steam Engineering	6,000,000
	$21,522,279

TITLE P. REPAIRS TO SHIPS' EQUIPAGE

Under Bureau of Ordnance	$1,000,000
Under Bureau of Construction and Repair	1,500,000
Under Bureau of Steam Engineering	800,000
Under Bureau of Supplies and Accounts	250,000
	$3,550,000

TITLE X. STORES (RESERVE)

Purchase and manufacture of smokeless powder	$2,400,000
*Ammunition for vessels	73,289,530
NOTE: $23,210,120 included in this estimate to meet obligations already incurred.	
Ordnance supplies (miscellaneous)	63,000,000
NOTE: $30,500,000 included in this estimate to meet obligations already incurred.	
Ammunition for vessels building or authorized	7,000,000
Clothing and small stores	27,000,000
Provisions	15,520,216
Medical stores	1,000,000
	$189,209,746

*The Secretary of the Navy is authorized to incur obligations not to exceed $11,000,000 in addition to this estimate.

TITLES E AND R. ADDITION TO PLANT—INDUSTRIAL AND MILITARY

Specific	Public works	$42,694,375
	(Here should be listed all the items of public works as shown in the appropriation bill: The item "R. and P. at navy yards" is not included here, but is found under titles G. and S.)	
	Emergency expenses (extensions)	4,750,000
Specific	Naval hospital, Fort Lyon, Cal., purchase of land	19,600
Specific	Naval hospital, Key West and Great Lakes	2,700,000
Specific	New and improved machinery, torpedo factory, Newport	200,000
Specific	Navy mine depot	3,000,000
Specific	Navy nitrate plant	9,150,000
	General improvements and additions estimated for by Bureau of:	
	Ordnance	3,000,000
	Construction and Repair	1,700,000
	Steam Engineering	1,300,000
	Supplies and Accounts	750,000
	Improving and equipping navy yards for construction of ships and to meet urgent needs of navy yards, stations and bases	10,000,000
		$79,263,975

TITLES G AND S. MAINTENANCE OF PLANTS (INDUSTRIAL AND MILITARY)

Specific	Naval Training Station, California	$225,000
Specific	Naval Training Station, Rhode Island	350,000
Specific	Naval Training Station, Great Lakes	725,000
Specific	Naval Training Station, St. Helena	310,000
Specific	Naval War College, Rhode Island	38,850
Specific	Naval Torpedo Station, Newport, R. I.	200,000
Specific	Naval Home, Philadelphia, Pa.	115,645
	Maintenance of hospitals	2,700,000
	Rent of land for hospitals, Key West, and Great Lakes	300,000
	Maintenance expenses estimated for by Bureau of:	
	*Ordnance	3,000,000
	*Yards and Docks	14,500,000
	*Construction and Repair	15,000,000
	*Steam Engineering	13,500,000
	Supplies and Accounts:	
	*Storekeeping expenses	13,000,000
	*Fuel and transportation thereof	15,000,000
	*Pay and allowances—naval personnel	25,000,000
	Provisions	10,000,000
		$113,964,495

*The expenditures under these items will be partially distributed to other titles, in the form of "overhead."

TITLE V. MISCELLANEOUS

	Under Office of the Secretary:	
	General administration charges	$4,350,000
	(Report to be made in detail showing distribution of these charges.)	
Specific	Contingent, navy	150,000
Specific	Temporary government for West Indian Islands	200,000
Specific	Expenses of Naval Consulting Board	100,000
Specific	Investigations of fuel oil	60,000
	Aviation	220,383,119
	(Estimate for aviation expenditures included here pending the establishment of proper accounting divisions for all aviation costs.)	
Specific	State marine schools, reimbursement of	75,000
Specific	Care of lepers, Island of Guam	20,000
	Under Bureau of Navigation:	
	Transportation and travel allowance of enlisted men, etc.	12,000,000
	Recreation for enlisted men	150,000
	Contingent and miscellaneous	20,000
	Gunnery and engineering exercises	425,000
	Outfits on first enlistment, etc.	9,975,000
	Instruments and supplies	1,000,000
	Ocean and lake surveys	155,000
	Organizing the naval reserve force	200,000
	Schools or camps of instruction, naval reserve force	2,655,350
	Under Bureau of Ordnance:	
	Repairs to equipage (batteries) and supplies not chargeable to specific ships	5,000,000
	Experiments, Bureau of Ordnance	385,000
	Miscellaneous ordnance expenses	2,000,000
	Contingent	50,000
	Under Bureau of Construction and Repair:	
	Repairs to equipage and supplies not chargeable to specific ships	2,000,000
	Miscellaneous Construction and Repair expenses	2,000,000
	Under Bureau of Steam Engineering:	
	Repairs to equipage and supplies not chargeable to specific ships	1,400,000
	Miscellaneous steam engineering expenses	2,000,000
	Original investigations and extended experimentation of naval appliances	160,000
	Under Bureau of Yards and Docks:	
	Contingent and miscellaneous	250,000

Under Bureau of Supplies and Accounts:	
Pay of officers and men on aviation and all special duty	$22,372,946
Freight	4,000,000
Miscellaneous fuel and transportation	9,400,000
Miscellaneous maintenance expenses	836,625
Under Bureau of Medicine and Surgery:	
Contingent, miscellaneous and supplies	1,500,000
Transportation of remains	350,000
Care and treatment of sick in civilian hospitals	1,000,000
Miscellaneous, medical department	300,000
Specific *Naval Emergency Fund	100,000,000
(Quote wording of Act.)	
	$406,923,050

Following these estimates would appear all the matter in the bill relating to legislation of various character now found there. The appropriations for the Naval Academy and for the marine corps would next appear. And finally the provision for unexpended balances of prior appropriations being continued and made available would be inserted.

Comparison with the current appropriation bill will show that the list of estimates above has been made up by placing each of the appropriations under one title, as far as possible, and those not capable of being so placed have been distributed among the titles in the proportions which past expenditures indicated as probable for the ensuing year. Undoubtedly, had these distributions been made by the bureaus concerned, at the time the estimates were originally submitted, the proportions would have differed from those chosen. However, the principle would have remained the same.

In handling such a bill very much the same methods as those now employed would be followed. Each bureau would submit its own estimates, and would explain them to the Congressional committees. Items would be stricken out, decreased or increased, as at present. Finally the bill would be passed with the final approved estimates included. The total sum appropriated for "Naval Establishment" would then be taken up on the treasury books and would be charged with all vouchers submitted. The question of the separate estimates would not be handled by the treasury at all,

*This amount will be distributed to the titles under which actually expended.

in a bookkeeping way, although these estimates might serve as a guide from time to time in passing upon the legality of certain payments made. Thus, the treasury might be in some doubt about passing vouchers for the Virgin Islands, were it not for the estimate "Temporary Government for West Indian Islands."

In the Navy Department the bureaus would maintain cognizance of the estimates for which they were responsible, somewhat in the same way as they now manage their appropriations. There would be this great difference, however: allotments of funds for working purposes would always be directly toward the objects of expenditure, with no considerations of various sources of supply, as at present. In deciding whether or not to authorize funds for a contemplated purpose the first and primary point to consider should always be the desirability or necessity of the expenditure. The second point is in regard to how much has already been expended for similar purposes. If expenditures made and contemplated bid fair to exceed the yearly estimate for that particular purpose, the unforeseen reasons should be recorded, so that at the end of the year perfectly definite explanation may be submitted to Congress relative to the over-expenditures. Similarly, estimates which have not been fully utilized should carry a note of explanation in the report. Of course, the total of the whole appropriation could not be exceeded without having obtained a deficiency appropriation.

It is believed that one of the greatest obstacles in the past to amending our appropriation system has been the fact that each year the estimates for the various appropriations could be compared with the estimates of the preceding years submitted in the same form, and a fair check could thus be maintained by Congress, as long as conditions did not greatly vary from year to year. The war has upset all that. It is impossible to gage now the amount needed under a given appropriation by the amounts appropriated last year or the year before. Consequently, now is the time, if ever, to introduce the reform.

The simplest method to pursue would be to add to the naval appropriation bill now in course of legislation, wording about as follows:

Provided, That the amounts here appropriated (except for the Naval Academy and for the marine corps) shall constitute one fund to be called "Naval Establishment" and shall be disbursed and accounted for as such.

And *Provided further,* That the Secretary of the Navy shall report to Congress the expenditures of the naval establishment, divided according to the accounting headings of the naval accounting system, and hereafter all estimates shall be submitted under those headings. And *Provided further,* That the amounts marked "Specific" herein shall not be exceeded.

All unexpended balances of appropriations made for the naval establishment, except for the Naval Academy and the marine corps, shall on June 30, 1919, be transferred and credited to the appropriation "Naval Establishment," and for that purpose such balances are made available for the fiscal year 1920. *Provided,* That all unexpended balances of appropriations for the Naval Academy and for the marine corps shall be transferred and merged with the corresponding appropriations contained in this act.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

SYSTEM

By CAPTAIN J. F. HELLWEG, U. S. Navy

A large number of new ships are being commissioned, particularly small ones, and many of the young officers ordered to them have had little previous experience as commanding officers or heads of departments. These officers will eventually develop some system for handling the details of their work, but at the expenditure of time which could be more profitably devoted to other important duties.

In order to save them this time, the following scheme is published, hoping that it will be of as much assistance to them as it has been to me. I have used this system on four ships and one shore station and it has saved considerable time and effort for all officers responsible for the execution of the work.

The allotment of details to many subordinates prevents the overloading of the various heads of departments, while at the same time insuring execution of the work.

ONE GENERAL SHIP'S OFFICE

The ideal arrangement on any class of ship is *one general office* with the various heads of departments assigned desk room only There should be *one filing cabinet* of ample size with *one filing system.* This cabinet should be centrally located in the general office. The saving in time in handling correspondence cannot be overestimated. *No papers go out of the office except in the mail,* the risk of loss is reduced therefore to a minimum. All yeomen are under the eye of the chief, necessitating regular office hours. They cannot waste time, hidden in some office with a magazine or newspaper. All yeomen are available for work. Any yeoman seen unoccupied is given the work which next develops. The output is enormously increased without overwork-

ing any of the office force. Inter-departmental correspondence on board ship is eliminated, as everything is handled in one office. Various short cuts are possible, and suggest themselves when the system is tried. I have used this system with marked success and recommend its trial. If all new construction eliminated the old system of numerous small separate offices, and one large well-ventilated and well-lighted centrally located general office was provided, increased efficiency would result. Flat-top table desks with side drawers should be provided, each with chairs on opposite sides of the central opening; one for yeoman and the other for head of department. Typewriter should be secured to a "swing-up" on yeoman's side of desk.

Immediately after receipt of mail, it is logged and thrown to the various desks having cognizance of it; there to be acted upon by the head of the department, *without any waste of time for logging and indexing as is required by the separate office system.* The captain's yeoman logs all mail, notes to whom thrown, acts as head filing clerk, and sees that all letters are promptly acted upon, returned and forwarded. A rubber stamp with numbers from 1 to 12 or higher assists in throwing the mail expeditiously. This column of numbers is stamped on the margin of the letter or on a slip of paper clipped to the letter, and a pencil check is made against the number whose attention is required. The following key for throwing mail will be found satisfactory for the average small ship. Larger ships will have to add additional numbers for their greater subdivision of work:

1. Executive officer.
2. Navigating officer.
3. Ordnance officer.
4. Communication officer.
5. Chief engineer.
6. Medical officer.
7. Pay officer.
8. Information of all officers. To be initialled and passed on. Last one to return papers to office.
9. Post a copy on bulletin board.
10. File.
11. Place contents or requirements of this letter on a card in tickler system.
12. First lieutenant.

The captain, sitting at his desk, can dictate letters to his yeoman seated opposite. He can discuss any questions with his heads of departments without their leaving their desks, and can obtain their views IMMEDIATELY *instead of as now,* with our old-fashioned push-the-button-and-wait system. How much time do you suppose is wasted daily in the entire fleet, waiting for some one who has been sent for?

All records and correspondence are immediately available, *with the certainty that they are all there* and not scattered through two or three other offices, as is possible at present with the separate office system. The general office spells *co-ordination, team-work,* and *speed,* without which complete success can never be attained. This system is the antithesis of the "one-man-shop."

ROUTINE INSPECTIONS

The following synopsis explains the details of the system of inspections: "Inspections required by the Naval Regulations, Fleet Regulations, and Ship's Regulations, will be carefully made and logged in the proper records." "In order to eliminate the possibility of overlooking any inspections, all have been arranged in groups."

The requirements regarding each inspection are recorded on separate cards (standard 3-inch by 5-inch size), and each card numbered consecutively in its own group. Thus, while the weekly inspections are allotted numbers 10 to 40, up to the present time the cards are only up to and including number 29.

The groups given below are recorded on a standard 3-inch by 5-inch card in tabular form. Alongside of each group is entered in pencil the number of the highest card in that group. This synopsis of inspection cards will be found of assistance in several ways.

LIST OF ROUTINE INSPECTIONS

(White Cards)

Daily Routine	1–9	2	Weekly Routine
Weekly Routine	10–40	29	Monday 10–12
Fortnightly Routine	41–45	41	Tuesday 13–16
Monthly Routine	46–65	55	Wednesday ... 17–20
Quarterly Routine	66–85	75	Thursday 21–24
Semi-Annual Routine	86–100	88	Friday 25–27
Annual Routine	101–120	106	Saturday 28–29

The following copy of routine inspections listed by the above synopsis, shows the cards in my tickler. If each is copied on a standard sized card, they will be ready for tickler file.

1

SMOKELESS POWDER. DAILY.

Examine all powder samples of all indexes daily in a good light without removing stopper. Observe whether normal condition and appearance. Presence of reddish-brown fumes indicates decomposition of powder. Feel for temperature, as decomposition is accompanied by heat.

S. O. 22.

2

MESS GEAR. DAILY.

Mess gear inspected by petty officer in charge. Reported to executive if unsatisfactory regarding cleanliness, quantity, or if broken.

(Ship.)

MONDAY

10

HAMMOCKS, BEDDING. WEEKLY.

Bedding aired from 8 a. m. to 1 p. m. twice weekly. Hammocks inspected. While airing, hammock nettings thoroughly cleaned out. Owners of dirty hammocks or bedding restricted pending their cleaning. Inspection made by O. O. D. and P. O.'s of divisions. Logged in deck log.

Fleet Regs., 1917, Art. 403.

11

AUXILIARY MACHINERY. WEEKLY.

All auxiliary machinery inspected and tested weekly. To be made by chief engineer and executive, assisted by C. M. M.'s, C. W. T., C. G. M., and C. C. M., respectively. Results to be logged in engineering and deck log books, respectively. All auxiliary machinery to be moved by hand daily, and once weekly by steam.

N. I. 3045, 3046.

12

STOREROOMS, HOLDS. WEEKLY.

Storerooms, holds, etc., will be inspected weekly. Made by first lieutenant and medical officer, assisted by the C. P. O.'s of departments and storeroom keepers. Results to be logged in weekly hull book, accompanied by recommendations for necessary corrections or improvements.

N. I. 2702 (2) and 2115.

TUESDAY

13

ELECTRIC PLANT. WEEKLY.

To be thoroughly tested once weekly. Test to be made by electrician under supervision of chief engineer. Log results in steam log book.
(Ship.)

14

SMALL ARMS. WEEKLY.

To be inspected and overhauled weekly. Made by chief gunner's mate under supervision of ordnance officer. Log results in chief gunner's mate's inspection book, and in deck log book. Any losses or defects to be noted. Survey prepared immediately to cover necessary parts.
(Ship.)

15

DRAINS, VALVES, MECHANICAL DEVICES. WEEKLY.

All drains, strainers, cocks, valves, water-tight doors, hatches, slides and all mechanical devices for safety or handling of ship will be inspected and tested weekly. Made by executive and chief engineer, assisted by C. P. O.'s of various departments. Results to be logged in deck and engine-room logs, weekly hull book.
N. I. 2506, 2605, 2622, 3042-44, 3054, 3102, 3106, 3107, 2702.

16

SAFETY VALVES. WEEKLY.

Safety valves will be lifted on cold boilers by hand once weekly, and will be tested on other boilers. Careful inspection to be made of hand lifting gear, etc. Made by chief engineer, assisted by C. W. T. Log results in egine-room log.
N. I. 3073.

WEDNESDAY

17

PRIMERS, DETONATORS. WEEKLY.

Inspect magazines, primers, detonators, and smokeless powder samples weekly. Made by ordnance officer, assisted by C. G. M. Log results in C. G. M.'s inspection book and deck log.
R. 2027; N. I. 2311, 2628, 2811.

18

FLOOD COCKS. WEEKLY.

Flood cocks will be tested weekly. Made by ordnance officer, assisted by C. G. M. Results logged in deck log book and C. G. M.'s inspection book.
N. R. 2027.

19

SEARCH-LIGHT. WEEKLY.

Search-light inspected and tested weekly. Best done during daylight hours when load is small on machine. Inspect circuit, carbons, mirror, and lenses, to insure readiness for immediate use. Log results in engineer's log book.

20

COLLISION MAT AND GEAR. WEEKLY.

All collision gear will be inspected weekly after collision quarters, and defects repaired. Made by executive and divisional officer handling mat. (Ship.)

THURSDAY

21

DECK, CHESTS, BOAT BOXES. WEEKLY.

To be inspected weekly by officer of the deck, assisted by C. B. M., C. G. M., and others having deck chests. Boat boxes to be inspected by officers in charge of boats, assisted by coxswains. Any omissions, losses, etc., to be noted. Prepare survey for missing articles. Log in deck log. (Ship.)

22

NOZZLES, FIRE HOSE, SPANNERS. WEEKLY.

All fire hose, nozzles, spanners, and other fire fighting gear to be inspected weekly by executive, assisted by the divisional officers and C. P. O.'s. Log inspection and any losses or defects in deck log. Prepare survey for missing articles. (Ship.)

23

WHEEL ROPES, STEERING GEAR. WEEKLY.

Wheel ropes, steering gear, hand gear, relieving tackles, etc., to be inspected weekly by navigator, assisted by C. Q. M., and other Q. M.'s. Log inspection and results in deck log.

24

HAMMOCKS, BEDDING. WEEKLY.

(Copy inspection card No. 10.)

FRIDAY

25

BAG INSPECTION. WEEKLY.

Inspected weekly. Clothes mended, brushed, and cleaned. Any man with soiled clothing in bag to be restricted till cleaned. Inspection by division officer.

Fleet Reg., 1917, Art. 403.

26

BILGES. WEEKLY.

Pumped, cleaned, and inspected. Then inspect pump strainers, bilge suctions, etc. Made by executive and chief engineer, assisted by the storeroom keepers and C. P. O.'s of various departments. Storeroom keepers keep bilges clean under their storerooms.

(Ship.)

27

BATTERY. WEEKLY.

Inspect and overhaul battery weekly. Ordnance officer and G. M.'s guns' crews assisting. Any defects or losses logged in deck log book and C. G. M.'s inspection book. Prepare survey for any parts missing or broken.

SATURDAY

28

HULL INSPECTION. WEEKLY.

Weekly Hull Board inspections can be made any time during the week. Results will be logged in the hull book by each officer. Book to be checked weekly by executive and submitted to captain by noon Saturday.

N. I. 2701 (4), 2702, 2703, 2704, 2705 (2).

29

SHIP AND CREW. WEEKLY.

By captain, executive, chief engineer, ordnance officer and first lieutenant. Log results in deck and engineer's log books.

41

SMOKELESS POWDER. FORTNIGHTLY.

The powder in one or more charges of each index is visually inspected for signs of decomposition or change of appearance.

S. O. 22.

46

LEAD LINES, LOG, SOUNDING MACHINE. MONTHLY.

Check accuracy of lead lines. Inspect patent log and sounding machine monthly. Made by C. Q. M. under navigator's supervision. Log inspection in deck log book. Made and logged the first day of the month.

I. 1605.

47

AIR PORTS, HATCHES. MONTHLY.

Inspect all air ports, hatches, doors, etc. See gaskets free from paint, and rubber alive. Log inspection and results. Make necessary repairs. Made by C. C. M., and reported to executive. Made and logged the first day of the month.

N. I. 2331 (8).

48

CHAIN CABLES. MONTHLY.

Chain to be ranged on deck to 60 fathoms for careful inspection of welds. Monthly.

N. I. 2631 (1).

Two reliable petty officers' sole duty on heaving in chain to watch each link as it comes in for signs of cracks in welds.

N. I. 2631 (3).

First inspection made by executive and C. B. M. Inspection and condition logged in deck log book.

49

UPTAKES, BOILER CASINGS. MONTHLY.

Inspect air spaces between uptakes and boiler casings, also casings. Made by chief engineer and C. W. T. Log results in engineer's log book.

N. I. 3069 (1), (2).

50

AIR AND CIRCULATING PUMP VALVES. MONTHLY.

All air and circulating pump valves to be inspected monthly by chief engineer. Inspection and results logged in engineer's log book.

N. I. 3048.

51

FEED TANK, CONDENSERS. MONTHLY.

Inside surface of feed tank and condensers inspected by chief engineer, assisted by C. M. M. Log inspection and results in engineer's log book.

N. I. 3050 (3), 3053.

52

GENERAL MESS ACCOUNTS. MONTHLY.

Inspect storerooms, take inventory of stores preparatory to calculation of mess standing, auditing, etc.

(Flotilla.)

53

LITMUS TEST, SMOKELESS POWDER. MONTHLY.

Make prescribed litmus test of all powder samples. If test fails, the surveillance test is to be begun at once. Made by ordnance officer. Log results in deck log.

S. O. 22.

54

FIRE EXTINGUISHERS, APPARATUS. MONTHLY.

Fire extinguishers, fire apparatus, hand pumps, etc., are to be inspected monthly by executive officers, assisted by C. C. M., and any omissions or defects corrected. Log inspection in deck log.

N. I. 2331 (3).

55

OIL LAMPS AND LANTERNS. MONTHLY.

All oil lamps and lanterns are to be lighted and kept burning for a sufficient time to insure their being ready for use. Log inspection in deck log.

N. I. 2607 (13).

66

BOILERS, FURNACES, ETC. QUARTERLY.

Inspect all boilers, furnaces, brick-work, casings, etc., once quarterly. See dry pipes and internal feed-pipe holes clear. Made by chief engineer, assisted by C. W. T. Log results in engineer's log book. (Boilers to be inspected after 700 hours steaming.)

N. I. 3064 (1), (4).

67

DOUBLE BOTTOMS. QUARTERLY.

Inspect all reserve feed tanks, bilges, etc., throughout ship for condition of rivet heads, butt-straps, condition of paint, etc. Made by executive and chief engineer. (Quarterly board.) Log results in hull book and inspection in deck and engineer's log books.

N. I. 2702 (1).

68

FUEL TANKS, BULKHEADS, ETC. QUARTERLY.

Inspect plating and bulkheads, separating fuel-oil tanks and compartments from other compartments. Also done whenever oil is received on board. Made by chief engineer, assisted by C. W. T. Log result in engineer's log book.

N. I. 2702 (1).

69

STORES, CABLES, SPARE PARTS, ETC. QUARTERLY.

Inspect all stores, spare parts, cables, hawsers, sails, etc., once quarterly. Cables will be scaled, painted; swivels, shackles, pins, etc., overhauled, refitted, and greased. Made by heads of all departments. Log results in deck and engineer's log books.

N. I. 2636 (1), 2631 (7).

70

COAL BUNKERS. QUARTERLY.

Coal bunkers will be inspected once a quarter and the condition of the bulkheads and protective coating very carefully noted in hull book and the steam log book.

N. I. 2705 (3).

71

ALL MACHINERY NOT IN STEAM ENGINEERING. QUARTERLY.

Inspect all machinery not under Bureau of Steam Engineering. Submit data for report on condition for bureaus concerned. Made by chief engineer, assisted by C. P. O.'s. Log results in the engineer's log book.

R. 2808 (1).

72

HULL BOARD. QUARTERLY.

Hull Board will thoroughly inspect all parts of ship, etc., in accordance with N. I. 2701 (1), 2702, 2703, 2704. Board consists of three commissioned officers (one engineer officer). See 2701 (1). Log results in hull book and note inspection in deck and engineer's log books. Note special report regarding inspection on docking.

(2704.)

73

WAR HEADS. QUARTERLY.

Routine inspection of war heads. See ordnance instructions. Made by ordnance officer. Log results in deck log book.

74

HOLDING DOWN BOLTS, ETC. QUARTERLY.

Inspect all holding down bolts, nuts, bearing blocks, casing bolts, etc. Made by chief engineer and logged in engineer's log book.

N. I. 3046.

75

MESS OUTFITS, INVENTORIES. QUARTERLY.

All mess outfits, officers' and general mess are to be inspected, inventories made and missing articles accounted for.

N. R. 3042; N. I. 828, 2233, 4427, 4428.

86

CONDENSERS. SEMI-ANNUAL.

Inspect condensers, tubes, zincs, etc., at least once in six months. Made by chief engineer. Log results in engineer's log book. If much steaming has been done, examination should be made more frequently. Any signs of grease, immediately boil out with soda, if necessary.

N. I. 3050 (3).

87

SURVEILLANCE TEST, SMOKELESS POWDER. SEMI-ANNUAL.

Made in accordance with ordnance instructions once every six months. Log results in deck log book. Made by ordnance officer, assisted by C. G. M. If not provided with oven, send samples twice a year to nearest magazine, where test will be made and report submitted to ship.
S. O. 22.

88

PRESSURE TEST OF TORPEDO FLASKS. SEMI-ANNUAL.

See ordnance instructions regarding pressure tests of certain flasks. Made by torpedo officer at navy yard when possible.

101

OUTBOARD DELIVERIES, VALVES. ANNUAL.

Inspect all outboard valves, deliveries, zincs, propellers, etc., when docked. Made by Hull Board. Log results in both log books and hull book.
N. I. 2703 (1), (2).

102

FUEL-OIL TANKS. ANNUAL.

Inspect fuel-oil tanks and compartments inside. Made by chief engineer. Log result in engineer's log book.
N. I. 2702 (3).

103

AIR COMPRESSORS. ANNUAL.

Inspect and test air compressors and all parts of air pressure system in accordance with ordnance instructions. Made by torpedo officer. Log in deck log book.

104

TURBINES. ANNUAL.

Lift turbine casings and sight rotors. Made by chief and logged in engineer's log book.
N. I. 3044 (1), (2).

105

INVENTORY OF ALL SUPPLIES. ANNUAL.

All storerooms will be broken out and an inventory will be made of all stores, spare parts, etc., on board. Surveys will be prepared to cover any discrepancies. Inventory will be made by supply officer. Date of commencement and completion will be logged in log book.
N. I. 2231 (1).

106

CHAIN CABLES. ANNUAL.

A complete inspection of all cables on ship will be made annually. Chains will be cleaned, scaled, inspected for defects; shackles and forelock pins refitted, and greased or whiteleaded. Then chains will be repainted and remarked. Shots of cable will be shifted from bitter end to anchor end at this overhaul. Log in deck log book.
N. I. 2631 (7).

Having completed the "Inspection cards" according to the above models, place them in the file box which contains the following *division* cards: ($\frac{1}{3}$ cut) "Days of the Week." ($\frac{1}{3}$ cut) "Months of the Year." ($\frac{1}{5}$ cut) "Daily," "Fortnightly" and "When Occurring." The "Days of the Week" and the "Months of the Year" cards can be bought at any shop handling card index systems. For the other *division* cards, it is necessary to buy a supply of blank cards ($\frac{1}{5}$ cut), labelling them for any special divisions you desire to make; such as, "Daily," "Fortnightly," and "When Occurring" divisions.

A glance at the synopsis card shows that inspections Nos. 10 to 12, inclusive, are made on Monday, Nos. 13 to 16 on Tuesday, and so on. All "Weekly" inspection cards are distributed *in front of* their proper Day-of-the-week *division* cards. In the same way, inspection cards Nos. 1 and 2 are placed in front of one of the ($\frac{1}{5}$ cut) division cards labelled *daily* and the group is filed immediately in front of the *weekly* group. Inspection card No. 41 is filed immediately behind the *weekly* group and in front of another ($\frac{1}{5}$ cut) division card labelled *fortnightly*.

Next, take all the *inspection* cards marked *monthly*, Nos. 46 to 55, inclusive, and file them IN FRONT of the *monthly division* card of the current month; say, March.

As March is also the last month of the *quarter*, all *quarterly inspection* cards, Nos. 66 to 75, inclusive, will be filed with March group of *inspection* cards for *monthly inspections*.

The cards for *semi-annual* and *annual inspections* are also placed in the current month's group, as a constant reminder that they must be made when opportunity offers.

The operation of the *tickler system* is as follows: The first thing in the morning, the previous day's *division* card and all *inspection* cards are removed from their place in front and transferred to their appropriate place behind other *weekly division*

cards. This results in your having the current day's inspection cards in front, and all others arranged in their proper sequence behind, each group with its proper "Day-of-the-week" *division* card.

Regarding the monthly *inspection* cards, as each inspection is completed and logged, the card is transferred to the next month's *division* card. For example: Inspection card No. 48 requires inspection of chain cables. As soon as inspection is completed and logged, card is removed from the *March* group and slipped into the place behind March and in front of *April division* card. Card requires no attention till *April*, when it will reappear in the front row.

The handling of *quarterly*, *semi-annual*, and *annual* inspection cards is the same. As each inspection is completed and logged, its card is removed from the current month's group and slipped into the *monthly division*, three months, six months, or twelve months hence. No further attention is necessary till the cards reappear in the current month's place.

In starting the tickler system, all cards are crowded together in the current month's file. After the first quarter the cards will naturally scatter, owing to the separation of dates on which inspections are made. For instance, some quarterly inspections will be made during the first month, others during the second, and the remainder during the third month. As each card is advanced three months from date of inspection, the quarterly cards are scattered over the three months of next quarter. The same applies to semi-annual and annual cards.

By exercising a little forethought in starting the system, cards and therefore inspections can be spread over the required periods; so that at no time will there be either a feast or a famine. The system once started becomes automatic and saves you the necessity of keeping track of inspections. At the proper times, cards appear in front notifying you to make the required inspections.

Besides this AID TO THOROUGHNESS the *monthly* and *weekly* tickler can be used in other ways. For instance, I keep a supply of ordinary scratch paper cut to size of regular cards (3 inches by 5 inches). Anything to be done at some future date is scribbled on one of these memo. slips and placed in its proper *month* or *day* division. When the time arrives, the memo. slip automatically appears in front and I comply with it. If it is an order

directing the collection of data requiring considerable time, the memo. is placed sufficiently far in advance of the required date to collect the data and submit the report on time.

If directions necessitate repeated reporting at regular intervals, the requirements are recorded on a regular card, properly labelled and filed in its proper group.

If the requirement necessitates action only in the event of certain other occurrences, a permanent card is prepared and filed under a special group called *when occurring*. If the occurrence repeats itself, a reference to the *when occurring* group will furnish data regarding necessary action to be taken.

Each card carries at its bottom the article of the Navy Regulations or Fleet Regulations requiring the inspection. The more complete the synopsis on the card is, the greater help the card will be in future work. For instance, if the file number of correspondence pertaining to the subject is noted, all information on hand is immediately available to assist you in the case under investigation, saving much time.

If this system is intelligently supervised, it is practically impossible for you to forget anything, or to be late in complying with the numerous requirements of existing orders.

Everyone knows how difficult it is to locate information in the Regulation Book occasionally. Having located the desired information once, why repeat the search six months or a year later? Why not make a brief synopsis on a card and file it in your tickler. The next time you need the information you will have it immediately. Do not try to remember such details; if your brain is choked with details, you may lose sight of more important matters. Let your tickler keep you posted about all routine matters.

THIS SYSTEM ADDS A BIG PERCENTAGE TO THE AVAILABLE TIME OF THE WORKING DAY, as it releases your mind from all monotonous details and makes time available for other matters. It is astonishing how little time is required to supervise the routine work after the system is understood and is running. In addition, you have the certainty that nothing is being overlooked.

THE FILING SYSTEM

The filing system consists of the usual modern vertical filing system and the *day book*. Letters and reports are filed in stiff

folders to which they are secured by clips. Folders represent subject exclusively. I recently saw an attempt made to file letters by titles of bureaus, offices, names, etc. It was hopeless, inadequate, restricted, and confused. All naval officers have a certain familiarity with filing systems, and to permit the installation of such an inadequate system proves my claim: THAT THE ROOT OF MUCH EVIL IS LACK OF PROPER SUPERVISION.

One advantage of the system which is advocated in this paper is its flexibility. It grows as your requirements increase, and does not necessitate any very elaborate mapping prior to its establishment. The ideal method of indexing is to use index cards with JUST ENOUGH cross-indexing to cover normal requirements, but not to make a picture puzzle. KEEP A BRIGHT LOOKOUT FOR *overorganization*. Nearly all clerks and yeomen inherit this trait, and if not carefully supervised, will build a system requiring unnecessary labor. Remember that "Work makes work" and so on the tail is wagging the dog.

Instead of using index cards, some yeomen prepare two pamphlet lists on official size paper; one an alphabetical and the other a numerical list. This scheme has some advantages from the yeoman's point of view, although I do not consider it as good as the index card system.

One of the most important parts of any filing system is its *day book* or chronological record of all outgoing and incoming correspondence. The following instructions which are pasted in the front cover of the *day book* are self-explanatory. It was found necessary to make them a part of the book in order to prevent yeomen from forgetting, in the beginning only, the routine, or making unauthorized changes adversely affecting the completeness or simplicity of the scheme.

THE DAY BOOK

"This book is a chronological record of all outgoing and incoming correspondence. To be of value, it must be ***absolutely*** complete in all details. If complete, it will save much time in locating correspondence."

"The book is divided into two parts:

Pages 1 to 100: Letters and reports sent.

Pages 102 to 200: Letters and reports received."

"*Letters and Reports Sent.*—This part records in tabular form to whom each letter is sent, the subject of the letter, where filed, and any remarks. Each day's record is complete and follows the previous day's record, from which it is separated by two or three blank lines, on one of which the current day's date is stamped. This scheme results in each day's record forming a complete group under its own date, the separated groups adding clearness and greater facility in searching for correspondence."

"Endorsements are recorded in this section as letters sent, and under the remarks column a note is made indicating it is an endorsement."

"*Letters Received.*—This form is similar to the first section, except that it requires a double page for complete entry instead of a single page. It contains columns for recording the following data: From whom the letter is received. His file number. The date of his letter. Our file number. The subject of the letter and a column for remarks. The last two items, requiring most space, are given the entire right-hand page of each pair. The other items and one small blank column for indicating to whom the correspondence is thrown, occupy the left-hand page."

"Each day's record is separated from the previous day's group by the same scheme as in the first part of book."

Procedure.—Immediately upon receipt of mail, the date of receipt is stamped on each letter in the middle of the bottom margin. This scheme facilitates locating dates, as they can be seen by merely turning over the bottoms of the letters like turning over the pages of a book.

After stamping dates, all letters are logged in sequence in *day book,* first having started the day's record by stamping date in the middle of the page two lines below the last entry of the previous day.

All letters are then delivered to the captain. After glancing through them to acquaint himself with their requirements, he indicates by the key numbers to whom letters are to be referred for action.

The yeoman records in pencil in the blank column on left-hand page of "Letters received" the key numbers of officers, and then delivers letters. When letters are returned to captain's desk the key numbers are checked, and letters are filed or otherwise disposed of.

If answer is required, data is given in pencil memo. when letter is returned to captain's yeoman; or, answer may be prepared for captain's signature.

After a reasonable time, all officers against whom letters are charged will be notified as a check against their overlooking them.

Officers to whom letters are referred will initial same alongside their key numbers.

The operation of the system is much simplified where a general office is possible; but it will work equally well in an old ship, except that the captain's office takes much of the work.

The one thing to keep in mind is DO NOT OVERORGANIZE. Before you make any change—a one-time mistaken navy synonym for improvement—calculate the cost, and see if you can show a saving of 6 per cent on the investment. If you can, go ahead; it is good business. If you cannot, do not touch it. This applies equally well both to labor and energy as well as to dollars and cents. Captain F. R. Clark, U. S. Navy, gave me that advice when I went to Indian Head. It was his only advice, but it covered every case fully, and I advise all hands to try it in their work afloat as well as ashore.

A glance at this model of the numerical index (page 576) shows that sub-heads can be increased indefinitely without disturbing any others. This renders the system very elastic, capable of fitting the most detailed or the most general correspondence. All file numbers are entered on correspondence in pencil. If at any future date the subdivision of any folder appears desirable, a new folder can be started, a new sub-number assigned, the new number marked on the faces of the letters to be shifted, and noted in the file column of the *day book*.

All letters sent and received regarding the same subject carry the same file number ONLY. No attempt is made to give them special numbers in their folders, they are filed chronologically with the most recent date on top.

All ships having separate offices will require copies of the alphabetical and the numerical indexes in each office, so that each can prepare its letters as far as possible for the captain's signature, thereby relieving his office of much routine work. Do not conclude from this that the captain is a rubber stamp. Before any letter is drafted, the captain and all the officers interested

11 Battery, guns, ordnance cards *re* battery.
11-1 Guns, sights and gun mounts.
11-2 Practice, target, report of, correspondence *re*.
11-3 Electrical fire control, pipes voice, telephones, fire control reports and correspondence *re* ordnance cards, *re* fire control.
11-4
11-5
11-6

12 Books, signal battle and signal.
12-1 Books, library, professional, etc., library.
12-2 Confidential publications, receipts for, etc.
12-3 Logs, steam, deck and engineering, receipts for, etc.
12-4 Publications other than confidential.
12-5
12-6

13 Boats, landings, equipment, etc.
13-1
13-2
13-3

14 Boilers, general correspondence *re*.
14-1 Boilers, furnaces, cements, etc., paints boiler furnace.
14-2 Boilers, safety valves, settings, etc.
14-3 Boilers, grate bars.
14-4 Boilers, fittings.
14-5
14-6
14-7

15 Charts, correspondence *re*.
15-1 Hydrographic information, aids to navigation.
15-2 Anchorages, information *re* harbors, correspondence *re*.
15-3 Pilots, correspondence *re*.
15-4 Bases, correspondence *re*.
15-5
15-6

16 Clerks, mail. Mail.
16-1 Censorship, correspondence *re*.
16-2
16-3
16-4

in the subject discuss the matter fully. After a decision is reached, the letter is written and it *represents the combined opinion of all interested parties.* It is remarkable how quickly such conference methods clear up most situations and promote the "get-together" spirit. The results are obvious.

ROUTINE REPORTS

(Pink Cards)

Each report is recorded on a separate card (3 inches by 5 inches) in the same manner as *inspections,* the cards pink in color. They are given sequence numbers, and are arranged in the same groups with the *inspections* cards. There is also a synopsis card showing all reports. The following is a model:

LIST OF ROUTINE REPORTS

When Occurring	1–40	32
When Unsatisfactory	41–50	44
Weekly	51–60	54
Monthly	61–80	77
Quarterly	81–100	88
Semi-Annual	101–125	111
Annual	126–150	141

The third column is in pencil and indicates the highest numbered *report* card in each group.

The following is a complete list of *report* cards taken from my tickler. If each is copied on a separate card in the same form, they will be ready for filing in the tickler:

1

ALL TRANSFERS OF ENLISTED MEN, STRAGGLERS, DESERTERS OR DEATH. — WHEN OCCURRING.

To: Bureau of Navigation.
Form: 1B.
By: Executive through C. O. direct to BuNav.
Ref.: N. I. 5221 (9).
The delivery or surrender of a deserter is reported to BuNav. direct on S.&A. form 228.
File: 8-1. Copy in executive's office.

2

CHANGES OF OFFICERS. WHEN OCCURRING OR WHEN SAILING ON AN EXTENDED CRUISE.

To: Bureau of Navigation.
Form: N. Nav. 64.
By: C. O.
Ref.: N. I. 5221 (23).

3

SURVEY AND APPRAISAL. WHEN OCCURRING.

To: Bureau concerned.
Form: Request. S.&A. 153 and 153a. Report of survey, S.&A. 154-1, 154-2.
By: Head of department through C. O. (N. I. 4731-1). Case less than $100 requires three copies. More than $100, C. O. forwards to S. O. P. who appoints three officers (I. 4733-1, 2), four copies required. Cases lost on receipt require five copies. See I. 4731-8, 2, 9, 10; I. 4733-2. Also see Manual of Supply Officers Afloat, 1917, Art. 467 and 246.

4

HEAT TEST OF POWDER. WHEN OCCURRING.

To: Bureau of Ordnance.
Form: N. Ord. 67.
By: Ordnance officer through C. O.
Copy to fleet commander.
File: 4-1.

5

REQUESTS FOR REPAIRS. WHEN OCCURRING.

To: Department bureau concerned.
Form: Letter. Separate one for each bureau and for each class.
By: C. O.
Ref.: N. I. 4331.
File: 34-1 to 34-6.

6

REQUEST FOR LEAVE OF ABSENCE. WHEN OCCURRING.

To: Fleet commander or S. O. P.
Form: Letter.
File: 8-6.

7

REPORT OF SPECIAL SURVEY IN ORDNANCE. WHEN OCCURRING.

To: Bureau of Ordnance.
Form: Ord. 20.
By: Ordnance officer.
File: 28-2.

8

SHIP'S ORDNANCE ALLOWANCE. — END OF COMMISSION.

To: Navy yard.
Form: Ord. 2.

9

CONSUMPTION, FUEL OIL, LUBRICATING OIL, FEED WATER. — WHEN OCCURRING.

To: Force commander.
Form: Special.
By: Engineer officer through C. O.
To be made only after runs of sufficient length to furnish accurate data.
File: 21.

10

DEVIATION TABLE. — WHEN DETERMINED. ALSO SEE ANNUAL REPORT NO. 130, June 30.

To: Bureau of Navigation.
Form: N. Nav. 12.
By: Navigator through C. O.
Ref.: N. I. 5222 (2) (d).
File: 17.

11

CHANGES IN ENLISTED PERSONNEL TO DATE OF SAILING. — WHEN SAILING. IF CHANGES HAVE OCCURRED SINCE LAST REPORT NO. 8 WAS FORWARDED.

To: Bureau of Navigation.
Form: N. Nav. 8.
By: C. O.
Ref.: N. I. 5221 (24).
File: 8-1.

12

RECORD OF GUN. — WHEN GUN IS TRANSFERRED.

To: Officer receiving gun. (Copy to BuOrd.)
Form: N. Ord. 39.
By: Ordnance officer through C. O.
File: 11.

Report cards Nos. 13, 14, and 15, are purely destroyer cards pertaining to torpedo reports, torpedo practice reports, and fuel oil receipt reports, respectively.

15

CHANGES IN RADIO PERSONNEL. — WHEN OCCURRING.

To: Director of Naval Communications.
Form: N. Nav. 29.
By: Radio officer through C. O.
Copies to force and base commanders.

16

DOCKING REPORTS. WHEN OCCURRING.

To: Bureau of Construction and Repair.
Form: Letter.
By: Hull Board through C. O. and C.-in-C. or S. O. P.
Ref.: N. I. 5222 (1) (b) and 2704 (2).
File: 24.

17

REQUESTS FOR ALTERATIONS. WHEN OCCURRING.

To: Department bureau concerned.
Form: Letter. Separate letter for each bureau and class.
Ref.: N. I. 4331, 4311 (10).

18

DRAFT AND LOAD ON DEPARTURE. BEFORE DEPARTURE FROM NAVY YARD.

To: Commandant.
Form: N. C. R. 125.
By: C. O. through Hull Division, sufficiently in advance of departure to permit draft being verified by an officer from that department prior to sailing.
Ref.: N. I. 5221 (35).
File: 22-1.

19

REPORT OF STRAGGLERS. ON DEPARTURE FROM PORT.

To: S. O. P.
Form: Letter.
By: C. O. prior to departure, giving list of names absent, with notation of rewards offered.

20

HOSPITAL TICKET. WHEN OCCURRING.

To: Hospital or hospital ship.
Form: G (one copy).
By: M. O. through C. O.
File: M. O.'s file.

21

REPORT OF CASUALTIES. WHEN OCCURRING.

To: Commander-in-chief, S. O. P.
Form: Letter.
By: C. O.

22

REPORT OF EPIDEMICS. WHEN OCCURRING.

To: Bureau of Medicine and Surgery.
Form: Letter. One to base commander, one to bureau.
By: M. O. through C. O.
File: M. O.'s file.

23

BOILER INSPECTION REPORT. WHEN OCCURRING.

To: Commander-in-chief, S. O. P.
Form: Special fleet form.
By: Chief engineer through C. O.
File: 14.

24

MEDICAL REQUISITION. WHEN OCCURRING.

To: Bureau of Medicine and Surgery.
Form: 4.
By: M. O. through C. O.
File: M. O.'s file.

25

SURVEY OF MEDICAL PROPERTY. WHEN OCCURRING.

To: Commander-in-chief, S. O. P., for appointing board.
Form: Ca.
By: M. O. through C. O.
File: M. O.'s file.

26

MEDICAL SURVEY. WHEN OCCURRING.

To: Commander-in-chief for appointing.
Form: Request for survey, Form L. Report of survey, Form M.
By: M. O. through C. O.

27

REPORT OF DEATH. WHEN OCCURRING.

To: Bureau of Medicine and Surgery.
Form: N. 3. Copy for base commander.
By: M. O. through C. O.
File: M. O.'s file.

28

MISCONDUCT REPORT. WHEN OCCURRING.

To: C. O. and pay officer.
Form: Admission and discharge.
By: Medical officer.
Copies for C. O., P. O., and enlistment record.
File: M. O.'s file.

29

REPORT OF TRANSFER OF PATIENTS TO OTHER THAN NAVAL HOSPITALS. WHEN OCCURRING.

To: Bureau of Medicine and Surgery through S. O. P. for approval.
Form: Letter. Copy for base commander.
By: M. O. through C. O.
File: M. O.'s file.

30

EFFICIENCY REPORT OF HOSPITAL CORPS. — WHEN OCCURRING.

To: Bureau of Medicine and Surgery
Form: 238.
By: M. O. through C. O.
File: M. O.'s file.

31

RECOMMENDATION FOR G. C. M. — WHEN OCCURRING.

To: Commander of base, force, or fleet.
Form: Letter forwarding following as enclosures: (1) Specimen charges and specifications; (2) statement by accused; (3) statements by all witnesses; (4) list of witnesses, both prosecution and defense; (5) complete copy of current enlistment record on N. Nav. 1B, marked in conspicuous place with age and length of service; (6) statement of pay accounts; (7) report of M. O. regarding man's fitness to remain in service.
Ref.: Fleet Regs., 1917, Art. 1002.

32

COMMUNICATION WITH AMERICAN DIPLOMATIC OR CONSULAR OFFICIALS. — WHEN OCCURRING.

To: U. S. diplomatic or consular official in port.
Form: Letter, or by officer messenger.
Ref.: Fleet Regs., 1917, Arts. 502, 503.

41

CONDITION OF MACHINERY UNDER C. & R. — WHEN CONDITION IS UNSATISFACTORY.

To: Bureau of Construction and Repair.
Form: Letter.
By: Chief engineer (C. O.).

42

REPORT OF ELECTRICAL MACHINERY. — WHEN CONDITION IS UNSATISFACTORY.

To: Bureau of Steam Engineering.
Form: Letter.
By: C. O. (engineer officer).

43

REPORT OF MACHINERY. WHEN CONDITION IS UNSATISFACTORY.

To: Bureau of Steam Engineering.
Form: Letter.
By: C. O. (engineer officer).

Report No. 44 is purely a destroyer report dealing with the unsatisfactory condition of oil (fuel) hose.

51

VACANCIES IN CREW. WEEKLY IN U. S. PORTS. 15TH AND 30TH ABROAD.

To: Bureau of Navigation.
Form: N. Nav. 25.
By: C. O.
Copies to base commander and force commander.
File: 8-8. Vacancy report filed in executive's office.

Report No. 52 is one that is not in force during war time. It pertains to reports regarding number of men qualified in swimming during the current week.

53

REPORT OF PROGRESS OF REPAIRS. WEEKLY AT A NAVY YARD.

To: Force commander.
Form: Letter.
By: C. O.
File: 34-9.

54

EMPLOYMENT OF AUXILIARY PATROL AND ESCORT. WEEKLY.

To: Base commander.
Form: Special.
By: C. O.

The following *monthly* reports apply purely to destroyers and are therefore not quoted. Nos. 61, 64, 68, and 69, referring to general mess accounts, engineering competition reports, summary of orders to pay officer, and summary of material drawn for the month.

62

SMOKELESS POWDER TESTS. MONTHLY. ALSO QUARTERLY, SEMI-ANNUALLY AND ANNUALLY.

To: Bureau of Ordnance.
Form: N. Ord. 67.
By: Ordnance officer through C. O.
Reporting all monthly tests. (See inspections.) One copy.
File: 4-1.

63

TARGET PRACTICE. MONTHLY.

To: Base commander.
Form: Letter.
By: Ordnance officer through C. O. Copy to force commander.
File: 11-2.

65

SPECIAL MUSTER ROLL. MONTHLY.

To: Bureau of Navigation.
Form: Letter.
By: Commanding officer. Showing complete alphabetical list of men on board arranged in three groups: (1) U. S. Navy; (2) U. S. Naval Reserve; (3) National Naval Volunteers. List also shows any changes made during month since last report.
Copies to: Base commander (1).
Ref.: Force commander's cable 139; base commander's letter 26 October, 1917.
File: 8-8. Muster roll filed in executive officer's office.

66

TEMPERATURE OF MAGAZINES. MONTHLY, WHEN TEMPERATURE IS OVER 90°.

To: Bureau of Ordnance.
Form: N. Ord. 43.
By: Ordnance officer (C. O.) through fleet commander. Also enter on back under remarks, temperatures of outside air, both maximum and minimum, on days on which temperatures of 90° or above are reported.
Ref.: C.-in-C.'s letter 114, 12 January, 1912.
File: 4-1.

67

ROSTER OF OFFICERS. MONTHLY.

To: Force commander.
Form: Special (F. C.'s). Replaces N. Nav. 343.
By: Commanding officer. In triplicate on 1st of month. Through base commander to force commander (1) (original) direct. Bureau of Navigation (1).
Ref.: Bureau Cir. L. 17-17, October 10, 1917, Par. 13.
File: 32-1.

68

SANITARY REPORT. MONTHLY.

To: Commander of base.
Form: Letter in accordance with base commander's medical instructions, 31 December, 1917.
By: M. O.
Copies to: Base commander (1), force commander (1), through B. C.
File: 202.

70

REQUESTS FOR TRANSFER. MONTHLY.

To: Bureau of Navigation.
Form: Letter giving list of all men requesting transfer or exchange. See BuNav. circular letter 3281-21, May 3, 1912.
By: Commanding officer.
File: 8-1.

71

REPORT OF ENLISTMENTS. MONTHLY WHEN ANY OCCUR.

To: Bureau of Navigation.
Form: 4B.
By: Executive officer through C. O.
Ref.: I. 5221 (6).
File: 8-5.

72

RADIO OPERATORS REPORT. MONTHLY.

To: Bureau of Navigation. Division of Radio, Radio, Va.
Form: N. Nav. 30.
By: C. O.
Copies to: F. C. and B. C.
Report also called "Men Detailed for Radio duty Report."

74

SMOOTH LOG BOOK. MONTHLY OR WHEN COMPLETED.

To: Bureau of Navigation.
Form: 20.
By: Navigator through C. O.
Copy: Rough, retained on board in loose leaf binder.
Ref.: I. 5221 (4).
Filed: Navigator's log room.

75

STATISTICAL REPORT. MONTHLY.

To: Bureau of Medicine and Surgery.
Form: N. M. S. K. (quarterly report form).
By: M. O. through C. O.
Copies to: Bu. M. & S. through B. C. (1), base commander (1), force commander (1), through B. C.
File: M. O.'s office.

76

ABSTRACT OF PATIENTS. MONTHLY.

To: Bureau of Medicine and Surgery.
Form: N. M. S. F. (quarterly report form).
By: M. O. through C. O.
Copies to: Bu. M. & S. through B. C. (1), base commander (1), force commander (1), through B. C.
File: M. O.'s office.

77

LIBERTY AND LEAVE BREAKING. MONTHLY.

To: Base commander.
Form: Letter.
By: C. O.
Copy to: F. C.

81

INSPECTION OF HULL. QUARTERLY.

To: Bureau of Construction and Repair.
Form: N. C. R. 1.
By: C. O. (Hull Board).
Filed in pocket in front of Hull Book.
Ref.: I. 5222 (1) (a).

82

STEAM LOG. QUARTERLY.

To: Bureau of Steam Engineering.
By: Engineer officer.

83

DESCRIPTIVE MUSTER ROLL. QUARTERLY.

To: Bureau of Navigation.
Form: N. Nav. 5.
By: Executive. Forwarded by C. O. (F.) (Art. 5221 I, Sec. 3. (5)).
Ref.: BuNav. cir. L. 31-17 of 9 November, 1917. Recapitulation, summary of discharge, desertions, deaths, and citizenship will not be filled out. Note omissions required by 31-17, Pars. 2 and 3.
File: 8-8. Muster roll filed in executive's office.

84

CONFIDENTIAL RADIO PUBLICATIONS. QUARTERLY.

To: Director of Naval Communications.
Form: Letter.
By: Radio officer through C. O.
Reporting numbers, etc., of all publications.

85

CRUISING REPORT. QUARTERLY AND WHEN SHIP GOES OUT OF COMMISSION.

To: Office of Operations.
Form: N. Nav. 81.
By: C. O.

In submitting this report for quarter ending (June 30), or when ship is placed out of commission, total distance steamed during entire fiscal year or for period of commission will be entered.

Ref.: 5221 I. (38).
File: 19.

87

COAL (FUEL) REPORT. QUARTERLY.

To: Bureau of Supplies and Accounts.
Form: N. S. & A. 115.
By: C. O. (engineer officer). (F.)
Ref.: I. 5221 (41).
File: Engineer's log room.

88

ENLISTMENT RECORDS. QUARTERLY.

Quarterly, all enlistment records are completed, efficiency marks recorded, and reports entered.

102

REPORTS OF FITNESS. SEMI-ANNUALLY AND ON DETACHMENT, September 30 and March 31.

To: Bureau of Navigation (direct).
Form:
By: C. O.
Art. 707 I.

103

GUN MOUNTS. SEMI-ANNUALLY, OR WHEN CHANGES OCCUR OR WHEN GOING IN OR OUT OF COMMISSION, June 30, and December 31.

To: Bureau of Ordnance.
Form: N. Ord. 40.
By: Ordnance officer.

When mounts are transferred from one ship to another or to station, this card is filled out and will accompany the transfer. Duplicate to bureau.
File: 11-1.

104

PROJECTILES (AMMUNITION CARD). SEMI-ANNUALLY, OR WHEN ANY CHANGES OCCUR ON COMMISSIONING AND GOING OUT, June 30 and December 31.

To: Bureau of Ordnance.
Form: N. Ord. 42.
By: Commanding officer.
Copy to flotilla commander.

Whenever ammunition is transferred from one ship to another or to a shore station, card properly filled out will accompany the transfer. Duplicate will be sent to Bureau of Ordnance. Operations 27741-648. S., October 20, 1912, *re* defects in ammunition discovered to be reported in detail.

File: 4.

105

POWDER (AMMUNITION CARD). SEMI-ANNUALLY, OR WHEN ANY CHANGES OCCUR ON COMMISSIONING AND GOING OUT, June 30 and December 31.

To: Bureau of Ordnance.
Form: N. Ord. 41.
By: Commanding officer.
Copy to flotilla commander.

When ammunition is transferred from one ship to another or to a shore station, card will be filled out and accompany transfer. Duplicate being sent to the Bureau. Operations 27741-648. S., October 20, 1912, *re* defects in ammunition discovered to be reported in detail. Forward powder tags where powder is defective, etc.

File: 4.

107

GUNS, SMALL ARMS. SEMI-ANNUALLY, WHEN CHANGES OCCUR OR WHEN GOING IN OR OUT OF COMMISSION, June 30 and December 31.

To: Bureau of Ordnance.
Form: N. Ord. 39. Small arms reported on same card.
By: Ordnance officer.
Copy to flotilla commander.
File: 11.

108

ORDNANCE EQUIPMENT. SEMI-ANNUALLY, WHEN COMMISSIONING, CHANGES OCCUR, GOING OUT OF COMMISSION, June 30 and December 31.

To: Bureau of Ordnance.
Form: N. Ord. 70.
By: Ordnance officer through C. O., copy to flotilla commander.
File: 11.

109

FIRE CONTROL CARD. SEMI-ANNUALLY, WHEN GOING IN OR OUT OF COMMISSION, WHEN CHANGES OCCUR.

To: Bureau of Ordnance.
Form: N. Ord. 51.
By: Ordnance officer.

Whenever any changes affecting data on cards occur, a card reporting such changes only is submitted, both by sending and receiving ship, copy of card to accompany shipment. Give bureau numbers on instruments.
File: 11-1.

110

REQUISITION AND PRICED INVOICE. — SEMI-ANNUALLY.

To: Bureau of Medicine and Surgery.
Form: B. Four copies. Forwarded for approval.
By: M. O. through C. O.
File: M. O.'s office.

111

STATEMENT OF EXPENDITURES OF TITLE "B" MATERIAL OF EACH DEPARTMENT. — SEMI-ANNUALLY, June 30 and December 31.

To: Bureau of Supplies and Accounts.
Form: Letter, showing inventory of values by departments of all articles under title "B" only, both articles on board and separated from the ship but still considered as belonging to ship. *In preparing statement* see Bu. S. & A. letter 200-10 200-306 of March 25, 1913.
By: Commanding officer.

126

MEDICAL HISTORY (OFFICERS). — ANNUALLY, January 1.

To: Bureau of Medicine and Surgery.
Form: All loose sheets containing medical history from form H-Green.
By: M. O. through C. O.
File: M. O.'s office.

127

INVENTORY OF MEDICAL PROPERTY. — ANNUALLY, July 1.

To: Bureau of Medicine and Surgery.
Form: D and Da (one copy).
By: M. O. through C. O. and C.-in-C.
File: M. O.'s office.

128

ANNUAL REPORT. — ANNUALLY on June 30, and detachment of C. O., C.-in-C.

To: Commander-in-chief.
Forms: Fleet forms 5 and 7.
By: C. O. through flotilla commander. See N. I. 916.
In quintuplicate: Three to C.-in-C., two to flotilla commander.
Folder: 13.

129

STATISTICAL REPORT. ANNUALLY, July 1.

To: Bureau of Navigation.
Form: N. Nav. 109B.
By: C. O., giving statistics of the enlisted force.
Art. 5221 I, Sec. 3 (1).
File: 8-8.

130

INVENTORY OF COMPASSES. ANNUALLY, June 30. Also see "When Occurring" report No. 10.

To: Bureau of Navigation.
Form: 9 and 12.
By: C. O.
(F.)
Ref.: I. 5222 (2) (c).

131

SEAGOING AND OTHER QUALITIES. ANNUALLY, June 30.

To: Bureau of Construction and Repair.
Form: 2.
By: C. O.
Annually after sufficient data have been collected.
Through fleet commander (F.).

132

STEAMING COMPETITION. ANNUALLY, June 30.

To: Navy Department.
Form: Special.
By: C. O.
Through fleet commander.
(F.)

133

ELECTRIC PLANT REPORT. ANNUALLY, June 30. On commissioning.

To: Bureau of Steam Engineering.
Form: N. S. E. Nos. 31 and 33.
By: Engineer officer through C. O.
Form: 31 and 33 to be made by destroyers but once a year, on June 30.
Electric logs not required from destroyers.
Ref.: I. 5222 (4) (b).

134

RECRUITING STATISTICS. ANNUALLY, January 1.

To: Bureau of Medicine and Surgery.
Form: X (one copy).
By: M. O. through C. O.
To be submitted annually, showing any recruiting done during the year.
File: M. O.'s office.

135

AMMUNITION EXPENDITURE. — ANNUALLY, June 30.

To: Bureau of Ordnance.
Form: N. Ord. 70a.
By: Ordnance officer through C. O.
BuOrd. letter 27777 (I) 6/20 circular No. 4, April 19, 1913, requires annual report of expenditures of ammunition for fiscal year and cost thereof.
File: 4.

136

EQUIPAGE, TITLE "B" BALANCE SHEET. — ANNUALLY, June 30.

Balance sheet for equipage, title "B," together with abstract of receipts and expenditures.
To: Bureau S. & A.
Form:
By: Supply officer through C. O.

137

PHYSICAL TEST OF OFFICERS. — ANNUALLY, January 1.

To: Bureau of Navigation.
Form:
By each officer through C. O. reporting having completed all tests for previous year, and including record of physical examination for current year. (Waived during war times.)

138

PAY OF ENLISTED FORCE. — ANNUALLY.

To: Bureau of Navigation direct.
Form: 270.
By: P. O. Report showing the pay of the enlisted force for specified month. The bureau sends out the form and the flotilla paymaster prepares it for the ship. It is signed by C. O. and then forwarded.
Art. 5221, Sec. 3 (2) I.

139

BATTLE SIGNAL BOOKS, GENERAL SERVICE RADIO CODES TACTICAL SIGNAL. — ANNUALLY, January 1, or when relieved of command.

To: Naval Operations.
Form: N. Nav. 2Q, N. Nav. 1Q.
By: C. O. (direct).
All registered numbers of all confidential publications issued by operations are to be listed in this annual report.
Ref.: I. 5221 (39).
File: 12 and 12-2.

140

SANITARY REPORT. ANNUALLY, January 1.

To: Bureau of Medicine and Surgery, through the C.-in-C. for approval and forwarding.
Form: Letter. Three copies, one to M. & S., one for base commander.
By: M. O. through C. O.
File: 202.

141

DESCRIPTION OF RADIO PLANT. ANNUALLY, December 31.

To: Steam Engineering through C.-in-C.
Form: N. S. E. 25.
By: Senior engineer officer through C. O.
In duplicate: C.-in-C. (1), Department (1).
Copies to F. C. and B. C.

The "system" has been paid the most sincere flattery, having been copied repeatedly by many ships, both destroyers and others, including battleships. It is probable, therefore, that a number of officers are acquainted with the system.

The tedious detail work entailed in perfecting this system, the careful searching through files, regulation books, and pamphlets, to collect the data for *inspections* and *reports*, and the tabulation of data was done by my wife who spent over four months in 1910 to insure the system's accuracy.

Since her original successful efforts, I have attempted to keep it up to date. Everyone who contemplates using the system is advised to check it to insure that it covers the requirements of his particular type of ship.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

WINNING THE ENGINEERING WHITE E

By COMMANDER BRUCE R. WARE, JR., U. S. Navy

In December, 1915, the U. S. S. *Texas* was standing about 14th in the engineering competition. She finished the year June 30, 1916, in second place, having gained 13 places in six months; the next year, however, she finished in first place and won the white E.

The first step towards winning the competition was taken at a conference in the senior engineer officer's stateroom. Here it was agreed by all hands, deck, ship and engineers, to get together in earnest in order to win, not only the white E, but the gunnery trophy and the battle efficiency pennant. The order of the day from then on was to be "Co-operation for the ship!"

Therefore, with the welfare of the entire ship in view, each officer was assigned the duties for which he was best fitted. Thus assigned, we all started to get acquainted with our ship. Careful inspections and intensive observations were made of the crew and the machinery. Operating data, pressures and other values were recorded at all points throughout the ship.

About a week before the fleet went to Guantanamo in January, 1916, the data accumulated were analyzed and it was decided to concentrate at once upon the following three points:

1. To get the crew interested.
2. To systematize.
3. To teach and encourage true economy:

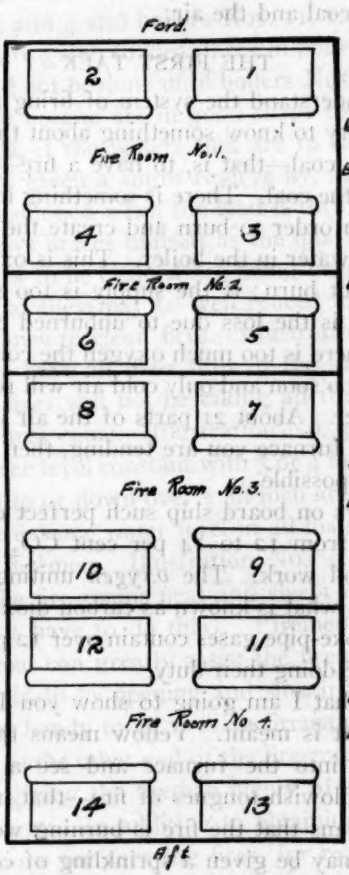
The winning of the gunnery trophy proved the success on deck. The co-operation received below from the deck also merits notice. From here on, however, this article will treat with the engineering struggle into the first place.

The three principal points enumerated above were subdivided as follows:

1. To get the crew interested:
   a. Publish information.
   b. Entertain the crew—make the men happy.
   c. Rate our own men up to fill vacancies.
   d. Show the men the results of their work.
2. To systematize:
   a. Auxiliary watches.
   b. Steaming watches.
   c. Liberty and leave.
   d. Advancements in rating.
   e. Organizations:
      1. Auxiliary stations.
      2. Fire-rooms.
      3. Engine-rooms.
      4. Power and light.
      5. Fresh-water tank—galleys, washrooms and laundry.
      6. Turrets and torpedo-room.
3. To teach and encourage true economy:
   a. Calibrate all instruments.
   b. Record performances methodically.
   c. Evade nothing—analyze performances with accuracy and fairness.
   d. Teach methods of obtaining economy:
      1. By illustrated lectures.
      2. By personal supervision.
      3. By enforcing every order published.
   e. Periodical upkeep.
   f. Constant study of the machinery installation for improvement.
   g. Constant study of the rules for the engineering competitions and explaining them to the officers and men.
   h. Coaling ship.

An inspection of the fire-rooms under way disclosed that the men knew practically nothing about intelligent firing, and as the coal that would be used en route to Guantanamo would be an important percentage of the total used for the year, it became

urgent to adopt correct methods. Accordingly, colored slides were made and illustrated lectures on firing were immediately started. The system of firing taught and developed differed materially from any system in use ashore or afloat.



SKETCH NO. 1.—Boiler Layout.

The boiler layout is shown in Sketch No. 1. All the boilers are fitted with superheaters excepting Nos. 5 and 6 in fire-room No. 2. There are four furnace doors to each boiler. The bunker doors are indicated by the small *b's*. The forced draft blowers, two for each fire-room, one port and one starboard, are directly over the fire-rooms. In order that the men would benefit from

the lectures, it was necessary to be most clear and to use simple language. They were, therefore, made to realize from the start that there were only three things for them to learn and understand: The necessity of team-work; the proper use of the tools given them; the coal and the air.

THE FIRST TALK

In order to understand the system of firing to be explained to you, it is necessary to know something about the things you have to use. To burn coal—that is, to have a fire—there must be air passing through the coal. There is something in the air which the fire must have in order to burn and create the heat that is to be passed on to the water in the boiler. This is oxygen, and without it the fire will not burn; if the supply is too small the fire will smoke and there is the loss due to unburned coal going out the smoke-pipe; if there is too much oxygen the combustion will have been completed too soon and only cold air will reach the important parts of the boiler. About 21 parts of the air is oxygen and if it is all used in the furnace you are tending, then you are doing the very best that is possible.

In naval boilers on board ship such perfect combustion cannot be reached and from 12 to 14 per cent CO_2 formation is considered very good work. The *oxygen* uniting with the *carbon* in the coal forms what is known as carbon dioxide (CO_2) and, as stated, if the smoke-pipe gases contain over 12 per cent the boilers you are firing are doing their duty.

In the plates that I am going to show you I have used colors to designate what is meant. Yellow means that the fire is hot. When you look into the furnace and see a mass of brilliant flames—white-yellowish tongues of fire—that mass or spot needs coaling. Red means that the fire is burning well and should not be disturbed, it may be given a sprinkling of coal. The green is used to indicate green coal—coal that has not had time to burn, or coal that had no air. This part of the fire does not need coal, it may require working by the hoe from above or it may need slicing beneath it. Blue stands for coking—a very bad, wasteful practice, as the air cannot get through the fire and the coal cokes, it does not burn. This blue crust must be broken. The black is the ash or clinker that must be removed. You should now know what the colors mean when I show you the lantern slides.

Before using the lantern, however, it is necessary that you understand the importance of team-work.

Team-work throughout the entire department is required. This means working together. As an example: Illustration No. 1: Boilers Nos. 1, 2, 3 and 4 and boilers Nos. 11, 12, 13 and 14 are steaming. Orders are given to clean fires in boilers Nos. 1, 2, 13 and 14. This should not be done until boilers Nos. 11, 12, 3 and 4 have their fires built up and are in good shape to keep the steam up. In other words, if the boilers that are to carry the greater part of the load are given a slight reserve by, say, heavier fires, the shock will be cushioned when the load is thrown on them. A football player always braces himself as the quarterback calls the signals. As the fires to be cleaned are being burned down, work the others up so that they may be well braced to take the strain when the signal comes to clean fires. Illustration No. 2: Chief water tenders must have all their fires of the same thickness so that a few (thin) fires will not be taking all the draft, this will make work at the fires equal. Illustration No. 3: Water tenders must keep their water level constant with 3 or 4 inches in the glass, it should never go up or down over ½ an inch and the chief water tender must have the same water level in all his steaming boilers, this will help the firemen. Illustration No. 4: Firemen, third class, must keep the fire-rooms neat and swept up (a *fireman* on the fires should not have to do this). Firemen, third class, detailed to get out coal can greatly assist the fireman by doing the following things: Help by opening and shutting the doors; help by putting the coal handy to all fires (a fireman should not have to reach way over to the other end of the fire-room for a shovelful of coal); help by giving the fireman plenty of space to work in, do not get in his way. In addition to obtaining team-work, the following instructions for carrying fires, for regulating fires and for method of firing will be carefully observed: Any man, fireman (first class, second class, or third class), water tender, chief water tender or of other rating, who has any suggestions and who believes he can better the results obtained will tell the officer of his watch. If you do not agree that this is *the* practicable, economical method of firing and can suggest a better way for saving coal, it is your duty to visit the office and tell your ideas to the senior assistant.

If you find it difficult at first to fire in the manner that follows, you must, however, stick to it, obey your orders, and I assure you that before your third steaming watch is through you will find it easier to keep up steam and that it is also easier to clean fires. The fires will not be as dirty and the boilers will remain cleaner and tighter as, by this method, they will not have been subjected to fluctuating heats or unwarranted and harmful "pushing and forcing."

During inspections it has been noticed that the old method of "coking" is being followed. This is a costly method and must stop from now on. Any man found "coking" will be considered as having disobeyed orders and not having the interests of his ship at heart. *Bad* fires are those that are:

a. Not level.
b. Full of holes.
c. Full of hollows.
d. Broken up by slice bar.
e. Of different thickness throughout the furnace.
f. Bad, in that half the fire is coking instead of giving off heat by burning.
g. Bottom of grate dark in spots, light in other spots. The bright spots are getting all the air.
h. Furnace door not shut tight.
i. Furnace door kept open too long, the fire does not burn, it chills.
j. Thick, dark and heavy fires.
k. Covered with crust formations.
l. Low in back, high in front.
m. Unable to see back wall on account of blinding wall of white flame which will burn out before reaching the tubes.

FIRING COAL IN THE FIRE BED

When burning soft bituminous coal the best results are obtained if the fires are kept level and rather thin. The best thickness naturally depends upon the coal and the strength of the draft.

As already explained, in the steam-boiler furnace, the hot fuel is made to burn by passing a current of air through it. This current of air supplies the necessary oxygen and carries away the gaseous products of combustion. If, now, the amount of coal in

the grates (that is, the fires are too thick) is in excess for the draft available there will not be sufficient current of air to do the work. Either the draft must be increased or the thickness of the fires reduced. If the speed of the ship is to be constant, use less coal in each shovelful and reduce the thickness. The coal must be fired in small quantities and at short intervals. The fuel bed must be kept level and in good condition by spreading the fresh coal over the thin spots only where the coal tends to burn away and leave the grate bare.

Leveling (by use of hoe) or disturbing (by use of slice bar and hoe) the fuel bed in any way whatsoever must be avoided as much as possible; it means a great deal more work for the fireman and is certain to cause the formation of much troublesome clinker. Furthermore, while the fireman is leveling the fires a large excess of air enters the furnace, and this excess of air greatly reduces the amount of steam made per ton of coal.

The uses of the shovel, hoe and slice bar are as follows:

(a) The *shovel* is to be used to throw coal on the various thin spots and hollows throughout the fuel bed that *need* coal. Coal must be placed in thin layers, never a full heaping shovel of coal. One-half a shovelful is plenty for one complete swing.

(b) The *hoe* is to be used to break a crust; when cleaning fires; hauling ash pans; and to remove a clinker. *Never* for leveling fires. The air and the shovel want to keep the fire level, why not let them do it for you? If you are in New York and want to go to Boston you are not going to Boston, then back to New York and then go to Boston before getting there. So, having opened your furnace door to coal the fire why do it all over again to get it in the right place? You men below open your door, fire your coal then open the door again and push the coal into the right place, where you should have thrown it. Use your shovel correctly, the air will do the rest.

(c) The *slice bar* is to be used to sift ashes through the grate bars and in renewing grate bars; NEVER allow the point of the slice bar to come up off the top of the grate bar. Using it as a lever is harmful, ruins the fire and causes clinkers.

The ash-pit door should be kept open. A large accumulation of refuse in the ash-pit must be prevented, as it is sure to cause an uneven supply of air under the grate. When you are burning coal that shows a tendency to clinker keep your ash-pit clean and

bright. All regulation of draft should be done with the damper and NOT with the ash-pit doors.

PLACING THE COAL IN THE FUEL BED

COVERING THIN SPOTS

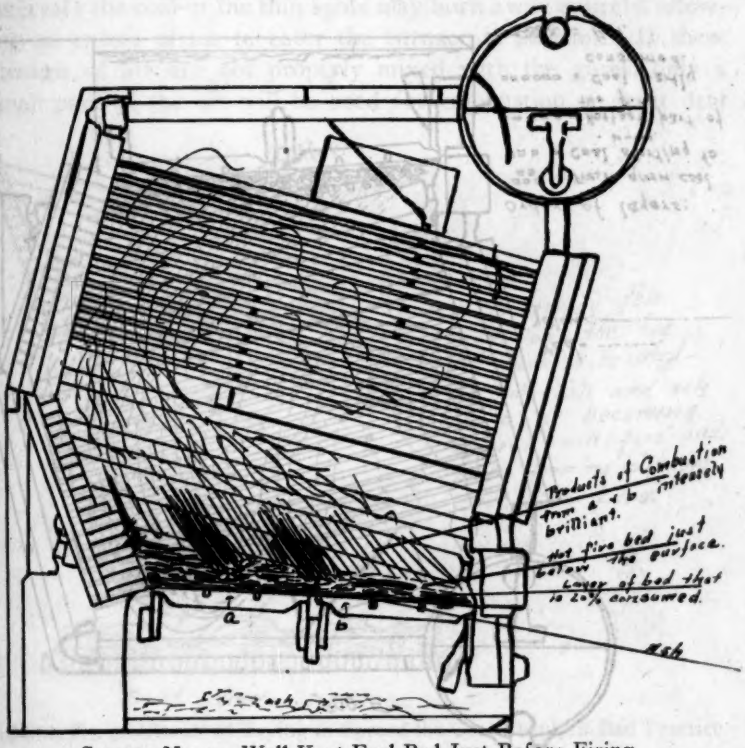
In firing, place coal on the thin spots of the fuel bed. Thin and thick spots will occur even with the most careful firing, because the coal never burns at a uniform rate over the entire grate area. In places where the air flows freely through the fuel bed the coal burns faster than in places where the flow of air is less. The cause of this variation in the flow of the air through the different parts of the fuel bed may be differences in the size of the coal, accumulations of clinkers, or the fusing of the coal to a hard crust. Where the coal burns rapidly, the thin places form.

Break all lumps up before throwing coal into the furnace. Air will flow much faster through lumpy coal than through fine coal. If you have lumpy coal on one part of the grate and fine coal on the rest of the grate, the lumpy part will get all the air and the fine part will not burn.

All the furnaces in a boiler must be fired alike, and therefore one man should fire all furnaces. The air flowing through all grates will have coal fired by the same man and one furnace will not rob another of its air. This can easily be done if firing is properly carried out. The way it is now being done, one man fires and HOES two furnaces, handling the coal twice. Let him fire correctly and he will not have to use the hoe at all; then he can handle twice as many fires, and he will stand a watch in eight or six instead of a watch in four or three. Think this over seriously, men, and realize how much hard work you are saving yourself by firing correctly and by cutting out the hoe.

Before throwing the fresh coal into the furnace, the fireman should take a quick look at the fuel bed and discover the thin spots. In a well-kept fire these spots can be recognized by the bright, hot flame and the colored glass assists in their discovery and location. The thick places with a sluggish, smoky flame or no flame at all will turn blue glass to purple or will turn yellow glass to orange or will turn red to dark crimson. Water tenders must use the colored glass provided and inspect their fires fre-

quently. Sketch No. 2 shows the condition of a well-kept fuel bed immediately before firing; *a* and *b* are the thin spots over which the fresh coal should be spread. In order to place the coal over the thin places the fireman should take a rather small quantity of coal on his shovel, for it is much easier to place the coal where it is needed with small shovelfuls than with large ones.

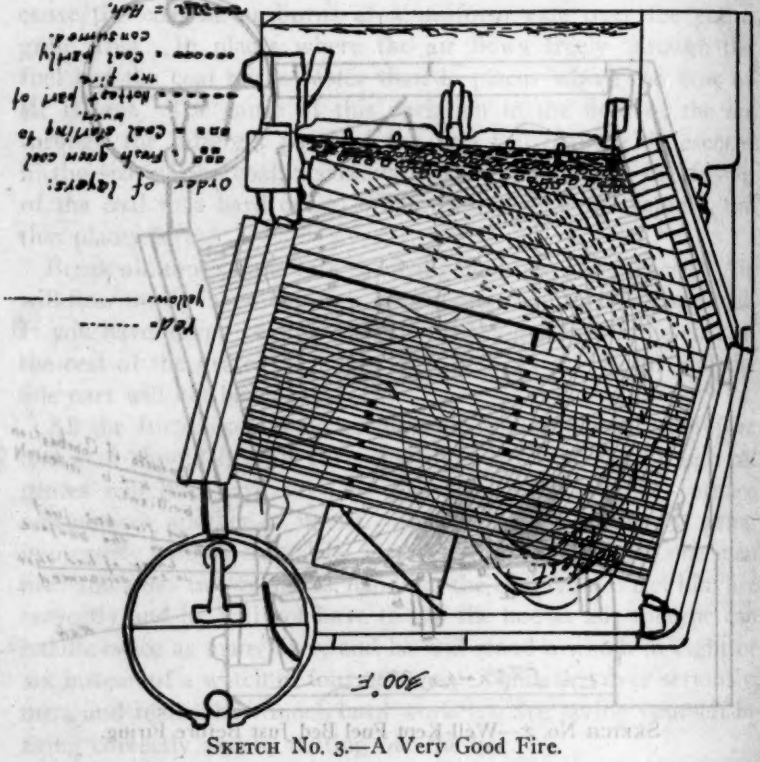


SKETCH No. 2.—Well-Kept Fuel Bed Just Before Firing.

Heaping the shovel means scattering coal over the floor-plates, with the accompanying loss into the bilges, and with coal all over the floor-plates you have a rough foundation to stand on. A good, firm footing is necessary for good firing.

The coal must be placed on the thin spots in thin layers. If you try to fill up the deep hollows in the bed at one firing, the freshly fired coal will fuse into a hard crust and, choking the flow of air, will cause the fire to burn slowly, starting new, high,

thick places. If the high places in the fuel bed are missed on one or two firings the hard crust on the surface will gradually burn through or crack, thus allowing more air to flow through, and the place will get back to its correct condition. BUT if a high place is caused by a clinker the flow of air can never be free and you must remove the clinker at once. Never wait for the bell or the clock if you locate a real large clinker, pull it out.



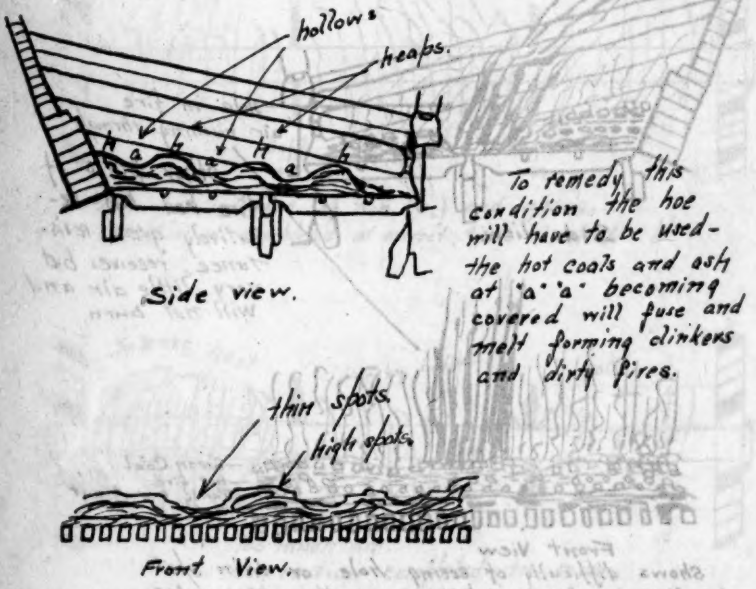
SKETCH No. 3.—A Very Good Fire.

How clinkers are formed will be discussed later. *Whatever may be the cause of the high, thick places in the fuel bed, the fireman must remember that they are places where the coal does* NOT *burn,* or if it burns at all it burns very slowly and must be given time to burn down to the correct thickness.

In Sketch No. 3 will be seen a very good fire with excellent combustion of gases and practically nothing but cold gas leaving the boiler. If the air had entered at 75° F., it may be said to be

leaving in this case at about 300° F. The red and yellows arrows, showing perfect mingling of gases; the red being given off from the high spots green, and the yellow being given off from the low spots, shown yellow.

If the firings are too far apart (that is, too long a time firing interval) the coal in the thin spots may burn away entirely, allowing an excess of air to enter the furnace in streams. If these streams of air are not properly mixed with the gases, only a small part of the air will be used for combustion, a great deal

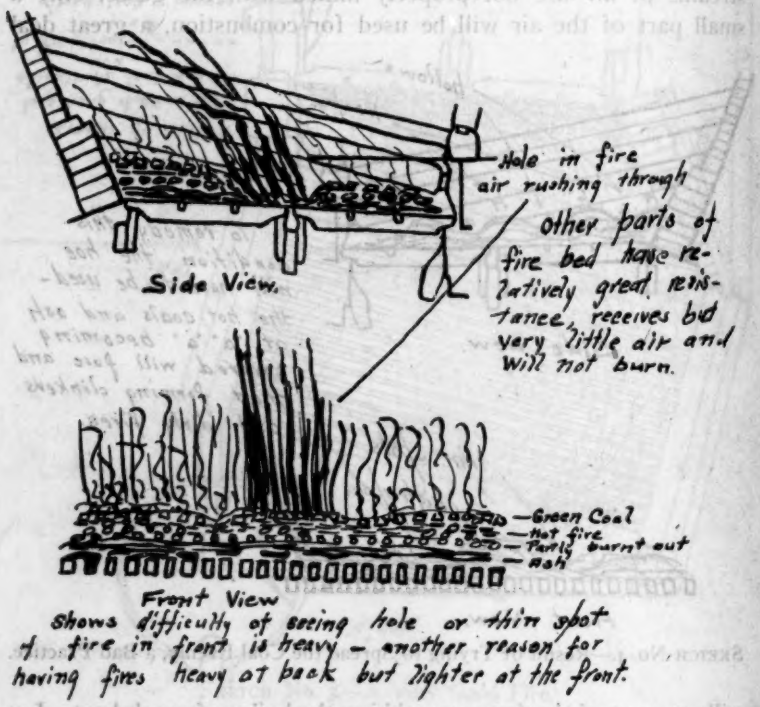

hollows
heaps.
a
a
a
b
Side view.
To remedy this condition the hoe will have to be used- the hot coals and ash at "a" "a" becoming covered will fuse and melt forming clinkers and dirty fires.
thin spots.
high spots.
Front View.

SKETCH No. 4.—Result of Trying to Spread the Coal Evenly, a Bad Practice.

will pass out of the furnace, robbing the boiler of much heat. Let us suppose that air enters the furnace at 75° F. and leaves the boiler at 575° F., it takes away with it the heat that was absorbed (given out by the coal) in raising its temperature 500° F. This heat is lost to the boiler. Another loss of heat occurs when holes form in the fuel bed because pieces of unburned coal fall through the grate when the fireman attempts to cover these holes with fresh coal. For these reasons, to prevent the formation of holes, firing should be made at short intervals, and all the more so if the fuel bed must be kept thin.

NEED OF AN EVEN FUEL BED

It has been stated that a fireman must look before firing and that he must use light shovelfuls, placing his coal on the thin, bright spots. If he persists in spreading the coal evenly over the entire surface it will accumulate in heaps in places where the flow of air is obstructed, and with several firings the fire bed will look as shown in Sketch No. 4.

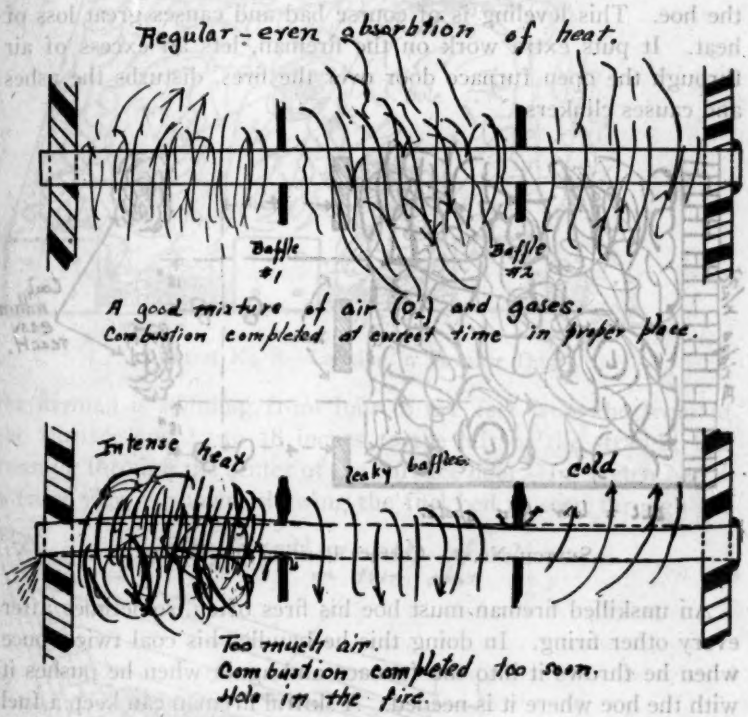


SKETCH NO. 5.—Hole Occurring in Center of Grate.

Here we see heaps of coal, *h*, through which little or no air can flow. Coal to burn must have air flowing through it. As the fresh coal at the top of those heaps is heated the volatile combustible is distilled off and rises in columns of smoke and combustible gas, which may pass out of the furnace only half-burned. Among these heaps of coal, *h*, are shown the thin spots, *a*, through which air passes freely, causing the coal in these places, and around the edges of heaps, *h*, to burn with a bright flame. When

the fuel bed gets into this condition it is impossible to see the surface of the thin spots and it becomes very difficult to correctly place coal over them. This state of affairs will lead to the production of holes with admittance of large quantities of excess air.

In Sketch No. 5 is shown a large hole in the center of the furnace. The heaps of coal do not burn, as all the air will rush



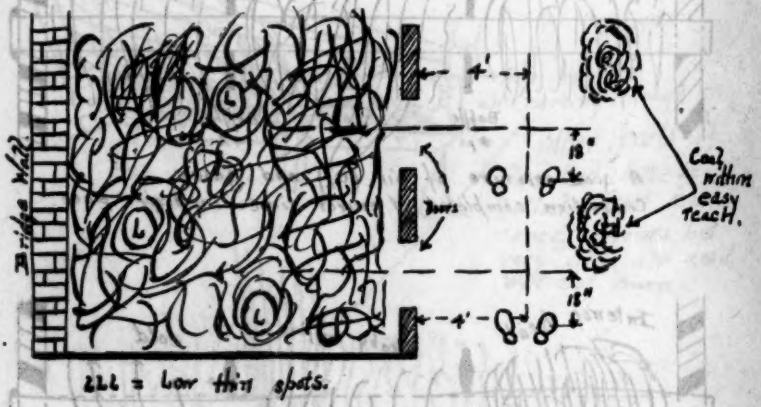
SKETCH No. 6.

through the hole—the air finds nothing to burn so it never becomes heated. The heaps simply distill and smoke and may be partly burned at the edges in contact with the outside of the column of air rushing through. The uneven strain on a tube is shown in Sketch No. 6.

It is well known how bad it is to have cold air strike the tubes of a boiler. In Sketch No. 5 only 80 per cent of the grate is working and then only at very low efficiency, for but little air

works through the masses of coal. The other fires in the boiler are also being robbed of their share of the air supply. The only way to remedy this is to break up the masses with the hoe, start all over again, try to do better and give the air a chance to do some of the work for you.

The quicker way to make such a bed level is to break the caked coal forming the heaps and to spread it over the thin spots with the hoe. This leveling is of course bad and causes great loss of heat. It puts extra work on the fireman, lets an excess of air through the open furnace door over the fires, disturbs the ashes and causes clinkers.



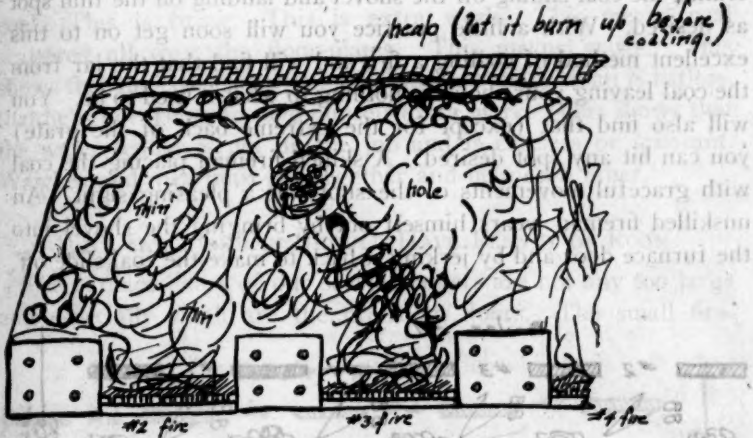
SKETCH NO. 7.—Correct Position for Firing.

An unskilled fireman must hoe his fires often, sometimes after every other firing. In doing this he handles his coal twice, once when he throws it into the furnace and again when he pushes it with the hoe where it is needed. A skilful fireman can keep a fuel bed level for hours without hoeing, simply by placing the coal where it is needed; and by doing so he saves himself not only the work of leveling the fires, but also avoids the growth of clinkers, thereby reducing the hardest work to be done in the fire-rooms—CLEANING FIRES—which will be discussed later.

PROPER POSITION IN FIRING

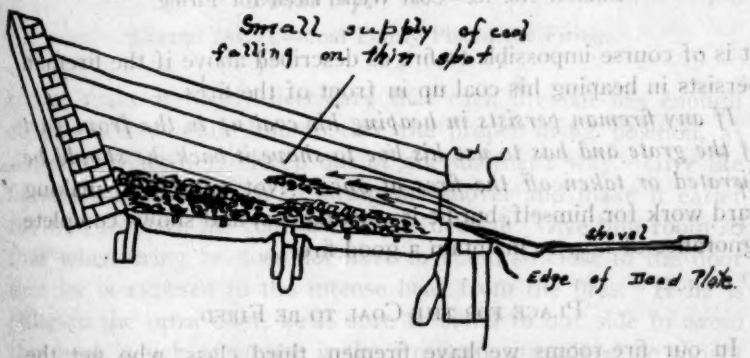
In order to put the coal in the proper place where it is needed, the fireman must stand in a correct position for doing so. The correct position is shown in Sketch No. 7. From this position he

can see the fuel bed, note the thin spots and with the least effort can throw the coal where it is needed. As shown in the sketch,



SKETCH No. 8.—Looking in Furnace Doors.

the fireman is standing from four to five feet from the front of the furnace and 12 to 18 inches to the left of the straight line running through the center of the furnace door. In Sketch No. 8, a front view is shown, showing the fuel bed as seen through the

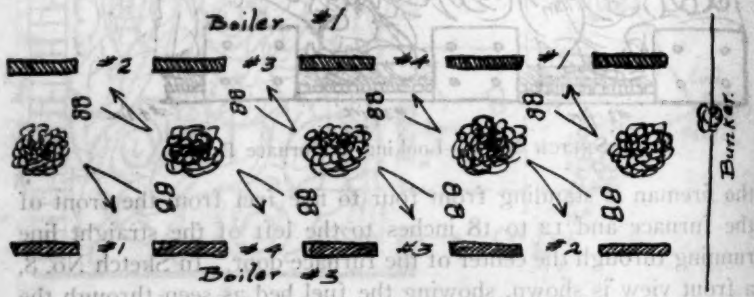


SKETCH No. 9.—Use of Shovel.

furnace door by the fireman. A thin spot is indicated and needs a thin layer of coal.

The fireman standing in the correct position, shown in Sketch No. 7, takes about a half shovelful of coal from the floor-plates, estimates the position of the thin spot and covers it with the coal

in the manner shown in Sketch No. 9. In this sketch, the shovel is shown stopped by suddenly laying it on the bottom of the door frame, the coal sliding off the shovel and landing on the thin spot as desired. With a little practice you will soon get on to this excellent method of coaling a fire and will find that the jar from the coal leaving your shovel is nothing to what it used to be. You will also find that (except for the extreme back of the grate) you can hit any spot desired. A skilled fireman placing the coal with graceful movements of the shovel is a pleasing sight. An unskilled fireman wears himself out by bringing the shovel into the furnace door and by jerking it back to make the coal slide off.



SKETCH NO. 10.—Coal Well-Placed for Firing.

It is of course impossible to fire as described above if the fireman persists in heaping his coal up in front of the fires.

If any fireman persists in heaping his coal up in the front part of the grate and has to use his hoe to shove it back, he should be disrated or taken off the fires at once. Not only is he making hard work for himself, but he is wasting coal and shows complete ignorance of how to maintain a good fire.

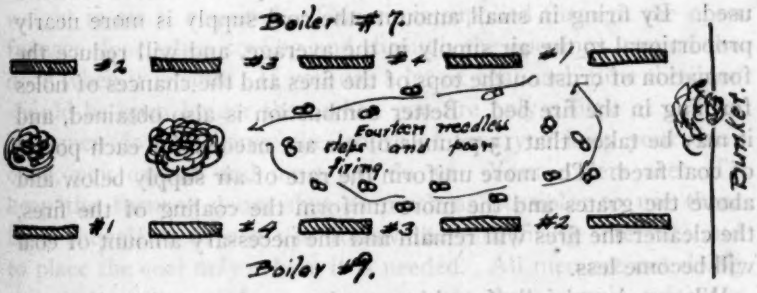
PLACE FOR THE COAL TO BE FIRED

In our fire-rooms we have firemen, third class, who get the coal from the bunkers and dump it on the floor-plates in front of the furnace doors. It is their duty, and the water tender must require, that they place this coal equally along the entire boiler front; that this little ridge of coal is never allowed to become lopsided; and that it must be maintained continuously. Sketch No. 10 shows well-placed coal for firing.

Sketch No. 11 shows that the ridge in front of No. 1 furnace has disappeared, been used up. The fireman in order to coal No. 1 fire has now to reach way over in front of No. 3 for his coal. This is tiring. This is extra work. This means coal scattered all over the floor-plates. This means waste. This shows that the coal-passer is inefficient, that the fireman is listless, that he is not trying to save himself extra work. This shows that the water tender is not on the job and is careless or ignorant. Watches and men must get together and help each other.

WHY THE FIREMAN SHOULD HAVE PLENTY OF ROOM

The furnace doors of our service boilers are not any too large and especially small are the fire-room floors. The small fire-



SKETCH NO. 11.—Coal Poorly Placed for Firing.

rooms make it highly necessary that each fireman has enough clear space to allow him to take the proper firing position, as shown in Sketch 7. Keep out of one another's way. Give the fireman room in which to swing his shovel and make it easier for him to place the coal where it is needed. Give him room so that when firing he does not have to stand so close to the door that he is exposed to the intense heat from the fires. If he is close to the open door, he is sure to stand to one side to avoid this heat, which of course is the wrong position, and he cannot place the coal where needed so down goes the steam, requiring a lot of hard work to get it up to the required pressure again. I cannot recall many times, when inspecting fire-rooms, that I have not seen a lot of coal accumulated on the tops of the ash-pit doors and along the boiler front. A man who has such a dirty boiler front is not standing in the correct, easiest position and

evidently does not know how to fire properly. He adds to his work, for he cannot be, and you may be sure he *is* not, hitting the back of the grates, so he must use his hoe (with enormous loss of heat and an extreme supply of cool air through the open door) to shove the coal back. Holes are also sure to occur at the back of the grate. Also coal scattered around not only makes the fire-room look dirty, but it makes it hard to walk around.

FIRING INTERVAL AND AMOUNT FIRED EACH TIME

The coal used in our navy is soft (bituminous) coal and to be burned properly must be fired at short intervals in small amounts. The depth or thickness of the fire depends entirely upon the amount of air supplied to it: fires will be thin at natural draft and will be the thickest when maximum full power forced draft is used. By firing in small amounts the coal supply is more nearly proportional to the air supply in the average, and will reduce the formation of crust on the tops of the fires and the chances of holes forming in the fire bed. Better combustion is also obtained, and it may be taken that 15 pounds of air are needed for each pound of coal fired. The more uniform the rate of air supply below and above the grates and the more uniform the coaling of the fires, the cleaner the fires will remain and the necessary amount of coal will become less.

When a shovel full of coal is spread over a hot, radiant fuel bed, the coal is heated rapidly and about one-third of the combustible matter is distilled off in the form of gases and tar vapors; and this distillation will be all over, completed in about one to four minutes (according to firing interval and amount fired). This distilled combustible matter requires additional air for its complete burning and this air enters through the fire door. The heavier the chargings become, the larger will be the amount of combustible distilled off, and accordingly the greater must be the air supply through the door to the top of the fire. Our boilers were built by the same firm, have the same size furnace doors, same size grates, same size ventilators, same size fire-rooms, same openings in furnace doors, same size ash-pits and ash-pit doors and the same uptakes and dampers (excepting, of course, boilers Nos. 5 and 6, which are slightly smaller). Every one knows our boilers are all the same size (except Nos. 5 and 6) and yet if all 14 boilers are steaming would an inspection show all fires exactly alike?

NO! Each boiler does one-fourteenth part of the steaming (in port on auxiliary watch with two boilers, each does one-half), but is each boiler getting one-fourteenth of the air supply? Is each boiler getting one-fourteenth of the coal burned? Is each boiler really doing one-fourteenth of the steaming? NO! I have yet to see a watch where this is entirely so. It depends entirely on the chief water tenders, who must see that all furnaces of all boilers under them are fired alike, sliced alike, handled alike, and all ash-pans cleaned, and they must demand and exact a complete uniformity of their entire watch. Not only is this "equalness" of great importance, but it is criminal to do otherwise, for such an extremely large amount of extra work is made necessary, and if fires are not uniform what work is done will be of low performance.

To burn the volatile combustible driven off, about 15 times its weight in air is required. This air is supplied through the open furnace door when coaling and through the openings around the door when it is shut. If you use a lot of coal each time the door should be open longer than when you fire only a little at a time. You men do not change the length of time you keep your door open, you cannot and must not do so. Your orders are: To keep the furnace doors shut as much as possible; to use three light shovelfuls of coal; to follow the time firing interval; and to place the coal only where it is needed. All men are not doing this and any man who cannot carry out these simple rules for firing should be disrated and taken off the fires.

Regulating the supply of air through furnace doors to the top of the fire bed is not possible. Some doors are warped more than others, some doors shut tighter, some firemen keep theirs open a longer time than others, and so the air to the top of the various fires is different; and yet if everything, draft included, is made equal and uniform throughout the fire-rooms, the amount of the distilled combustible given off from the surface of the fuel beds will be the same, and the above mechanical difficulties are taken care of. They are further reduced and the boilers do still better work if coal is fired in smaller amounts and in short intervals. It is far more efficient and better to use four one-half shovelfuls fired every two minutes than three heaping shovelfuls fired every three minutes; for not only do fires grow equally and uniformly, but it is also much easier to put the coal where it is

needed. By light, frequent firing, the distillation of volatile combustible is made nearly uniform and it is at all times nearly proportional to the air supply. Fires will be cleaner, better and easier to handle.

In closing this first talk it is desirous to summarize the points brought out. This may well be done by comparing what a GOOD fire is with what a BAD fire is (see page 598).

A *good* fire is one that is:

a. Level.

b. Of proper thickness. Thinner in front.

c. Shoved back from dead plate.

d. Ash-pans bright all over. If the ash-pans are *brilliantly* bright the fire is too thin, or there is a hole of large size in the fire, or there are many holes.

e. Top of fire bed light (white flames) all over. Such a fire needs coal when its turn comes.

f. A good fire is one that has an even burst of flame (white) from its entire surface; the bottom of the fire bed has a layer of fine ash that will fall into the grates when the slice bar is swept through it and this will also indicate that the fireman is putting his coal where it is needed.

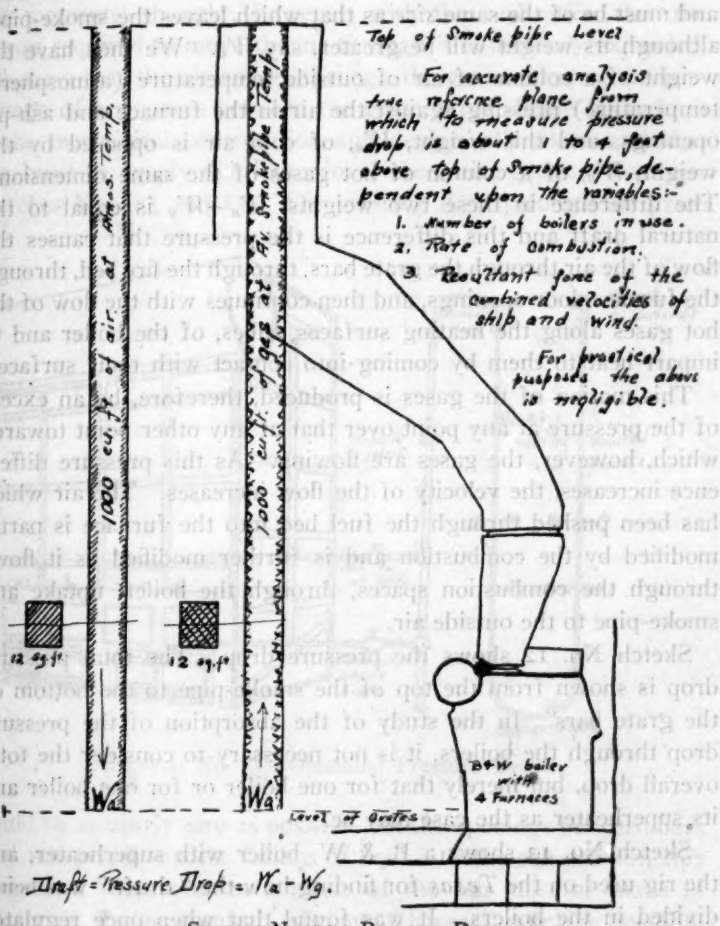
g. Clean boiler front and floor-plates.

THE SECOND TALK

The word "draft" has been much abused by scientists and experimenters, but by the practical, operating engineer it simply names a condition that exists in his heat-producing system of boilers, fire-rooms, uptakes, smoke-pipes, the outside air, ventilators and blowers (either exhausting fans in the uptakes or pressure fans supplying air under the grates). This "condition" produces the flow of air through the grates. It may be such as to cause a lot of air to flow, as occurs when the fire-rooms are closed and the large forced draft blowers are running, or it may be cut down by closing the dampers or stopped entirely by sealing up the boiler front.

There is not a fireman but knows that when the blowers are running it is necessary to carry heavier fires than when they are stopped. As soon as the forced draft blowers are stopped, the ventilators (openings to the outside air) must be opened. Then, instead of having the blowers creating the pressure, there is a

column of air extending from the furnace doors, which may be taken as high as the tops of the smoke-pipes. This column of air is as wide and as broad as the numerous openings, ventilators, hatches, holes, etc., added together, and will have a certain weight


Top of Smoke pipe Level
For accurate analysis true reference plane from which to measure pressure drop is about 1 to 4 feet above top of Smoke pipe, dependent upon the variables:-
1. Number of boilers in use.
2. Rate of combustion.
3. Resultant zone of the combined velocities of ship and wind.
For practical purposes the above is negligible.
1000 cu. ft. of air at Amos. Temp.
1000 cu. ft. of hot gases
12 sq. ft.
12 sq. ft.
B+W boiler with 4 Furnaces
Level of Grates
Draft = Pressure Drop = Wa - Wg.

SKETCH NO. 12.—Pressure Drop.

which we may represent as large *W*. From the grates, however, to the tops of the smoke-pipes there is also a column that has height, width and breadth, but it is not a column of air—it consists of hot gases formed by the burning of the coal on the grates, which we may represent by the letter W_g. The weight per cubic

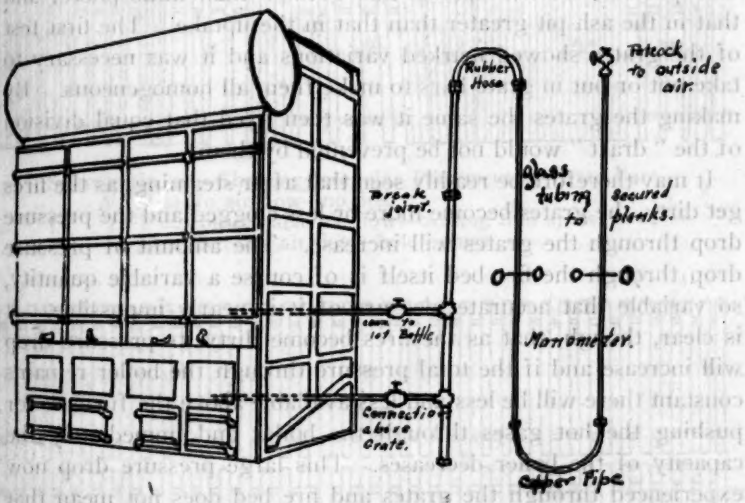
foot of the hot gas is less than the weight per cubic foot of the cold air. Of course, no more air can enter the furnace than the size of the openings in the furnace doors and the ash-pit permit. The part then of the supply W that can be utilized is thus limited and must be of the same *size* as that which leaves the smoke-pipe, although its weight will be greater, say W_a. We then have the weight of a column of air of outside temperature (atmospheric temperature) pressing against the air in the furnace and ash-pit openings, and this weight, W_a, of cold air is opposed by the weight, W_g, of a column of hot gases of the same dimensions. The difference in these two weights, $W_a - W_g$ is equal to the natural draft and this difference is the pressure that causes the flow of the air through the grate bars, through the fire bed, through the furnace door openings, and then continues with the flow of the hot gases along the heating surfaces, tubes, of the boiler and to impart heat to them by coming into contact with their surfaces.

This motion of the gases is produced, therefore, by an excess of the pressure at any point over that at any other point towards which, however, the gases are flowing. As this pressure difference increases, the velocity of the flow increases. The air which has been pushed through the fuel bed into the furnace is partly modified by the combustion and is further modified as it flows through the combustion spaces, through the boiler, uptake and smoke-pipe to the outside air.

Sketch No. 12 shows the pressure drop. The total pressure drop is shown from the top of the smoke-pipe to the bottom of the grate bars. In the study of the absorption of the pressure drop through the boilers, it is not necessary to consider the total overall drop, but merely that for one boiler or for one boiler and its superheater as the case may be.

Sketch No. 13 shows a B. & W. boiler with superheater, and the rig used on the *Texas* for finding how the "draft" was being divided in the boilers. It was found that when once regulated the magnitudes of the various "drops" would remain proportional, regardless of the "total draft," and that having determined the most economical series of steps in "draft absorption" for one speed, it would likewise be the most economical for any other speed above "steerageway." The greatest difficulty was found in the correct laying of the grates and in maintaining it. This is the

most important part of the boiler when the efficient utilization of the draft is obtained. It is nearly always neglected and simply taken for granted as being a constant and of small moment. A few moments' thought, however, with the realization that the energy required to move the air through it is uselessly expended, will show that the air spaces through the grate (that is, the percentage of air spaces between the grate bars) should be as high as the mechanical construction and design will allow, and that they must be evenly distributed over the entire grate. Compare Sketches Nos. 14 and 15. The pressure drop through the grate



SKETCH NO. 13.—Obtaining Pressure Drops.

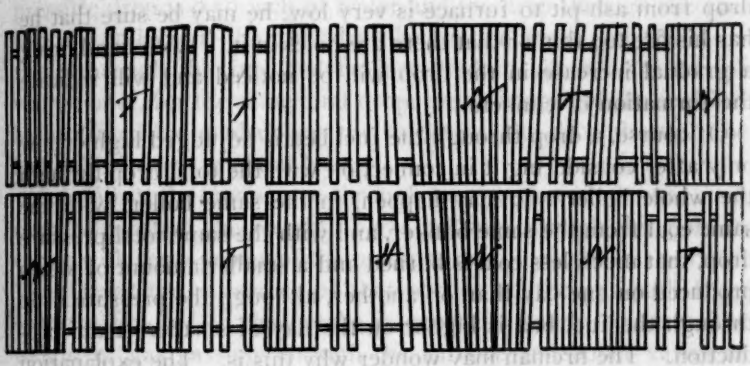
should be as nearly zero as possible, but the openings between bars must not permit excess falling of coal into the ash-pit. In this connection, therefore, an analysis of the ash must be made in order that the economical, efficient, "happy" *working* medium may be attained. The officers and men were made to realize the importance of correctly laying their grates, and it is felt that this contributed materially to winning the "E." The pricker bar, so long laid aside, again came into play and the grate bar openings maintained while steaming. Likewise, immediately after hauling furnaces the grate bars were turned, dumped; they were also scraped of any fused clinker that might be adhering to them.

Returning to a consideration of Sketch No. 13. In order to obtain the pressure drop through the boiler the joint was broken at the point indicated and the manometer end thrust into the uptake. The difference in the two levels was measured as so many inches. This apparatus was used to make certain that the pressure drop through the grates of all the boilers was the same; and that the resistance of the grate when there was no coal in the furnace should not be more than one-tenth of the entire drop. This was obtained by running the forced draft blowers and measuring the total boiler drop from the ash-pit to the uptake. The pressure in the uptake was greater than atmosphere, and that in the ash-pit greater than that in the uptake. The first test of the grates showed marked variations and it was necessary to take out or put in grate bars to make them all homogeneous. By making the grates the same it was then fixed that equal division of the " draft " would not be prevented by them.

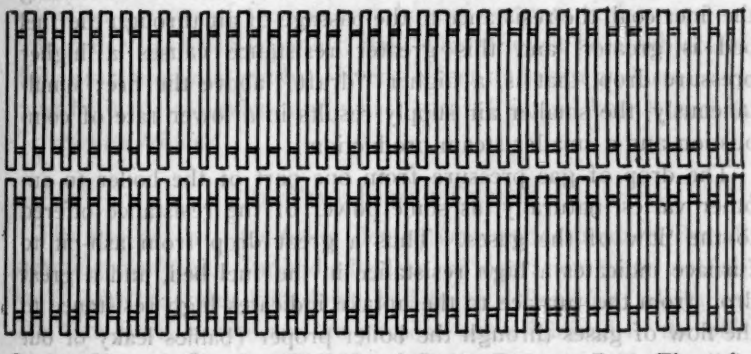
It may therefore be readily seen that after steaming, as the fires get dirty, the grates become more or less clogged and the pressure drop through the grates will increase. The amount of pressure drop through the fire bed itself is of course a variable quantity, so variable that accurate measure of it is nearly impossible. It is clear, though, that as the fires become dirty its pressure drop will increase and if the total pressure through the boiler remains constant there will be less and less available above the furnace for pushing the hot gases through the boiler and immediately the capacity of the boiler decreases. This large pressure drop now experienced through the grates and fire bed does not mean that the rate of combustion is high, on the contrary it is most likely to mean the opposite. It is common knowledge that if it is desired to increase the rate of combustion either (1) the fires must be worked more in order to break them up and lower their resistance, which is bad practice; or (2) more boilers must be cut in, which is good practice; or (3) the forced draft blowers must be run, which is good practice up to the point demanding more boilers, and then again at full power, which is the point where the boilers are producing all the steam the engines will take.

(In considering the cutting in or out of boilers versus the use of forced draft, the coal used to prime furnaces and cut in the boiler must be compared to the power consumption of the fans and in connection therewith the time element of operation must be

considered. The benefit that may be derived by having cut in a clean boiler so that later a dirty boiler may be cut out must also be given its due weight before the order to do one thing or the other is sent to the engineer officer of the watch.)



SKETCH No. 14.—Showing Irregular Placement of Grate Bars.
NNN = No air flow—no fire.
TTT = Considerable air flow—causing thin spots.
H = Extreme air flow—hole occurs.



SKETCH No. 15.—Showing Well-Placed Bars. Pressure Drop Through Grate Evenly Distributed.

The rig shown in Sketch No. 13 may also be used as a dead check on the dampers. When measuring the total boiler pressure drop, one connection being made to the uptake, have the damper closed. The two zeros should be reached gradually as the pressures equalize, if after a few minutes they do not do so, inspect the dampers. This was done on the *Texas* and two dampers were found six inches open when "closed."

The pressure (draft) gage was explained to the men and put into use when cleaning fires. Such a gage when connected to the furnace will give useful information as to the condition of the fire. For instance, after a man has cleaned a fire, if the pressure drop from ash-pit to furnace is very low, he may be sure that he has his fire too thin or that there are holes in it. With hand firing a gradual increase in the drop will be noticed and will indicate the formation of clinkers.

Of course, a drop through the fuel bed is adjudged high or low only after considering it in connection with the total drop through the whole boiler. It may happen, in the same boiler, with the same coal from the same bunker, and with the same total pressure drop, that much less coal is burned and a smaller amount of steam produced on one day than on another, although the pressure drop through the fuel bed is higher on the day of smaller steam production. The fireman may wonder why this is. The explanation may be drawn out thus: When coal is taken out of the side and bottom of a bunker, the larger pieces tend to flow out first, leaving the smaller pieces and dust in the far corners, which stay there to the last until all the coarser coal has been burned. When burning the finer coal, the resistance to the passage of air through the fuel bed is greater, and this greater resistance causes a higher pressure drop, that is, a higher "draft" above the fire; simultaneously, the smaller air supply results in a lower rate of combustion and a smaller steam production.

The drop of gas pressure from one part of the boiler to another varies, naturally, as some power of the resistance offered to the flow of the gases. Thus a great drop from ash-pit to furnace indicates a high resistance in the fuel bed, and a great drop from the furnace to the uptake indicates high resistance to the flow of gases through the boiler proper (baffles leaky or out of line). This law has been determined to be similar in some respects to Ohm's law as applied to problems involving the electrical resistance of conductors. It may be stated as follows:

(a) If the resistance to the flow of gases remains constant the pressure drop through any portion of the path of the gases will have a constant ratio to the total drop from the ash-pit to the uptake. Thus, for example, if the pressure drop through the fuel bed is 0.25 inch of water when the total drop is 0.50 inch, it will be 1 inch if the total drop is increased to 2 inches of water.

(b) If the total pressure drop from the ash-pit to uptake remains constant, the pressure drop through any portion of the gas path will vary in the same direction as does the resistance to the flow of the gases, although the magnitudes of the variations may not necessarily be in simple proportion. Suppose the total pressure drop is 0.50 inch of water and the drop through the fuel bed is 0.25 inch, if the total drop be kept constant, but the resistance through the fuel bed be increased to about 0.32 inch of water; or if, for the same total drop, the resistance of the fuel bed be increased by quadrupling the thickness, the drop through the bed will increase to about 0.40.

(c) When the resistance through any portion of the gas path remains constant the weight of gas passing through this portion varies with some power of the pressure drop through this portion. Thus, since the resistance of that portion of the gas path from over the fire bed to the uptake is generally nearly constant, the weight of gas passing through the furnace and boiler varies as some power of the pressure drop between these points. It has been determined by experiment that the weight of gases passing through the boiler is, approximately, directly proportional to the square root of the pressure drop through the boiler or through any other portion of the gas path having constant resistance.

In order to obtain economy, the "draft" must be a subject of daily discussion and study. Every officer and man on board ship must be made to understand what "draft" is and how to use it. *Ex scientia tridens.*

THE TIME-FIRING DEVICE

The use of the time-firing device was made standard for all steaming watches. Individual ideas of operation were not allowed and the rules laid down had to be followed at all times. The time-firing device and its purpose was explained to the officers and men. It was found that in order to be of real value cooperation from the bridge was necessary. Accordingly, instructions for its use were given to the deck officers and it was explained to them how they could assist. Any signals of change of speed were sent at once to the engine-room, including use of speed cones by ships ahead, and it was endeavored to anticipate speed changes if possible. The officers of the deck also kept the engine-room informed of matters of interest and the men on watch were

thus shown consideration. For instance, results of target practice, "How many hits did we get," were sent below as well as on deck.

In the use of the time-firing device the officer of the watch was required to anticipate needs for steam; for instance, if the evaporators were to be secured at 10 p. m., the time-firing interval should be increased at 9.45 p. m.

STANDING WATCH

The officer of the watch was required to spend the most of his time in fire-rooms. It was found that at least half of each hour had to be spent there in order to obtain an economical watch. He was also required to inspect the feed-water heaters twice each hour and if the temperature of the feed fell below 230° F. something had to be done; for instance, pump bilges and obtain a little more back pressure. The proper use of pumps and auxiliaries made it possible to carry a back pressure of from 26 to 35 pounds gage and a feed-water temperature of from 242° F. to 250° F.

The officer of the watch was furnished complete information of all standing orders, cut-off settings, tank capacities and as far as possible what changes he might look for during his watch.

In order to reduce the time the furnace doors were opened at each firing, operating gear was fitted to them. Firemen, third class, were detailed to work this gear and the officer of the watch marked these men as well as the other men of his watch. Each watch (every man on watch) was marked on regular scale.

OFFICE WORK

A board was hung outside the office and each day the average marks for the watches were posted. About once a week the marks of the men were posted. This board also furnished information as to the coal used by each watch, the total coal and the total water used for the day and the engineering multiple—first, for the day; second, for the month; and third, for the year to date. This multiple gained about .043 every day for six months. The board held a large E and the words "Fire light, fire often."

The performances of the other ships were posted whenever obtained.

The standing of watches was systematized and made rigid. In other words, the men were able to tell at least two weeks ahead of time when they would have auxiliary watch. The auxiliaries, such as ice machines and evaporators, were given their special details. These details were never changed and, it may be said that properly supervised, of course, they ran their own watches.

The men of the engineer's force knew that all vacancies of higher ratings would be filled on board ship. This further enhanced the values of the marks given each watch, and it was but a short while when the men fully realized it. It further increased the interest the men took in their work.

The office avoided as far as possible work out of working hours. The men were made to realize that so long as they worked during working hours their time off would not be disturbed.

Officers were on their stations during working hours, in port or at sea; and in addition to merely being around, they answered questions, they guided the men in their work, and were of genuine value. This reduced the time required to do things. In connection with cutting down time required, the telephone system was kept up and used. The senior assistant was always available and the men were made welcome in telephoning him for advice, reports or information desired. The desire to *do* things in the easiest and quickest way seemed to prevail and a real genuine "bound to win" spirit developed.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE UNITED STATES COAST GUARD: ITS MILITARY NECESSITIES

By CAPTAIN F. S. VAN BOSKERCK, U. S. Coast Guard

FOREWORD

The following paper was prepared several months prior to the outbreak of the present war, but it has been impracticable to print it until now.

The fact has become apparent that in the past the navy and the coast guard have not gotten sufficiently close together, but it is thought that from the beneficial results attending present association, each service will have appreciated the worth of the officers of the other, to the mutual advantage of the two services and the public interests.

Since mobilization, the enlisted personnel of the coast guard has increased until it now numbers about 6000 men—2000 more than on a peace basis—and many changes have transpired as to the disposition of the entire personnel, which is now scattered among coast guard ships, naval vessels, at air stations, in Washington, and in the several naval districts, and the need for experienced officers has been urgent.

It is suggested that now is the psychological moment to make a mental survey of conditions, to take a look at them from a fair, unbiased viewpoint, and thus to realize the errors of the past, brought about as they have been by misunderstandings and a lack of knowledge of facts.

THE AUTHOR

This paper has been written with the single idea of presenting to the officers of the navy and coast guard tentative suggestions for increasing the military efficiency of the latter service, which, if adopted, would be in the best interests of the navy and the

coast guard, when the relations that must exist between them in time of war are considered, or that should prevail in preparation for the same. They are not one-man ideas, but result from an experience of 29 years in the late revenue cutter service (now the coast guard) and from discussion of conditions with officers of the coast guard and of the navy, many of whom are warm advocates of the ideas advanced. If this paper serves no other end than to arouse an interest and general discussion that may be productive of results, the aim of the writer will have been accomplished.

The arm of the public service which is now the coast guard was originally established in 1790. As it increased in size, there was added a life-saving branch, which, in the course of years, became disassociated with the then revenue cutter service and was created a separate organization; but officers of the revenue cutter service continued to be detailed as inspecting officers of the life-saving service and elevated it to a high state of efficiency.

On January 28, 1915, the President signed the act of Congress creating the "United States Coast Guard," which unified the then existing revenue cutter and life-saving services. By the terms of the act, the coast guard "shall constitute a part of the military forces of the United States and shall operate under the Treasury Department in time of peace and shall operate as a part of the navy, subject to the orders of the Secretary of the Navy, in time of war, or when the President shall so direct." Thus the status of the coast guard is clearly defined and its officers and men are regulars in the same sense as are those of the army, navy, or marine corps; a fact that must not be lost sight of in following the subject matter of this paper. It is necessary for a clear understanding that we inquire into both the personnel and matériel of the coast guard to consider the strong and weak points of each and then to take immediate advantage of the former and rectify the latter without delay.

THE PERSONNEL

If we consider the coast guard with respect to the numerical value of its personnel, the service may not be deemed a large one, although 4000 men are practically the equivalent of the crews of four capital ships. We must differentiate, however, as between

mere "numbers" and "force" and realize that in the coast guard there lies the potentialities for the latter and advantage taken of that fact. We may here regard the words of a noted military writer as aptly applying: "The stronger each unit is in peace, the more efficient will it become for war; hence, the vital importance of aiming at quality and not numbers." We seek to increase the value of the coast guard as a "force," therefore it will become our duty to inquire as to ways and means.

The total personnel of the coast guard, as at present organized, consists of approximately 259 commissioned officers, line and staff, and about 4000 warrant officers and enlisted men. There are also 13 district superintendents who were transferred from the late life-saving service, and hold relative rank with certain grades in the commissioned rank. They are not sea-going officers.

In addition to the personnel above noted, there are at the Coast Guard Academy, Fort Trumbull, New London, three classes of cadets and cadet engineers. All of the line officers of the coast guard and practically every member of the two junior grades of engineers are graduates of that institution, while the senior grades of engineers are largely composed of graduates of colleges or technical schools where marine engineering is specialized in. The three-year course at the academy is a rigorous one, and upon graduation the cadets go forth exceptionally well equipped educationally for the profession they have chosen. That there are few "bilgers" may be attributed to the fact that the entrance examination is difficult and strictly competitive. It is also intended to assure that the successful candidate has the necessary groundwork to warrant his graduation, providing he applies himself to his studies.

It can be confidently stated that the Coast Guard Academy is yearly graduating young men who are as competent all-round officers as are to be found in any branch of the regular service.

Due to the excellent results that have eventuated from assigning junior line officers to engineering duty and junior engineers to line duty, the commandant of the coast guard has advocated the amalgamation of the engineer corps with the line, a project much to be desired, providing it can be accomplished with harmony to the best interest of the service.

While ballistics is included in the course in ordnance and gunnery, and Alger is completed, it is unfortunate that the cadets are

not afforded an opportunity to have practical experience with heavier ordnance than 6-pounders and 3-inch naval field pieces. Their knowledge so far as the *handling* of heavier pieces is concerned is confined to theory only. Does it seem a good business proposition to deny to the young officers the opportunity to put into practice that which they have been taught and which they have thoroughly learned while cadets?

The warrant officers and enlisted men attached to the vessels of the coast guard are as thoroughly drilled, both afloat and ashore, as infantry, as is possible with the means at the hands of their officers, and the station bills are modeled upon those of a certain destroyer. The crews are always under strict military discipline and may be regarded as highly efficient, so far as their military training extends. As a body of men they are the equal of any and they are an upstanding, fearless group of seamen—those who man the coast guard cutters and those who go down to the sea in ships know this to be so.

The principal shortcoming in the training of the ships' companies is the lack of experience with guns of a caliber that they will use in war, for while the present 6-pounders with which the cutters are armed will undoubtedly be carried in battery, it is a fallacy to believe that they will be the heaviest guns carried in war-time. The installation of 4-inch 50-caliber pieces has been urged within the past two years, but without avail. The point is: Must the coast guard wait until mobilization and then begin to train gun crews with the pieces they are to use for offensive and defensive purposes? There is not a range-finder issued a single coast guard cutter; hence, antiquated methods for determining the range must be resorted to, while good spotting is in reality solely depended on for results while on the range.

So far as the crews of the coast guard stations are concerned the men (with the exception of those who have previously served upon the ships) are lacking in the essentials of military training, but it is because they have never had the opportunity for acquiring any. In the late life-saving service there were no military features. Now, however, that the station crews are components of a military service, intensive training along military lines should be a matter for immediate consideration, because such training can be given without prejudice to their duty of saving life upon occasion.

The vast majority of the older men of the station crews have been retired, leaving the men on the active list comparatively young, and among recent recruits may be found many high-school graduates; the keepers realizing that to have their respective stations pass a satisfactory inspection, the personnel must be young, active, and intelligent men.

The writer has found the men (especially those in the Fifth Coast Guard District, Sandy Hook to Cape May) to be enthusiastic, keen to adapt themselves to their new environments, and desirous of keeping abreast of their mates on board of their ships. They are either "expert" or "proficient" signalmen, besides being a brave and hardy lot, who can face any wind or weather and stand the "racket." With training on board of ships, what a magnificient force for any emergency! The station crews are not armed in any manner. The writer is aware of instances where the men constructed rifle ranges, bought rifles and held target practice. Their ability to shoot should be encouraged and an opportunity given them to qualify as marksmen, etc.

There are now 1800 rifle clubs scattered throughout the country and their civilian members receive the encouragement of the government. Is it not a necessity that the men who in time of war would constitute the naval patrol should be given an opportunity to perfect themselves in musketry? In fact, should not machine guns, as well as rifles, be made the armament of coast guard stations?

It is difficult to note where any logic lies in the suggestion that because the crews of the present coast guard stations were originally created for the purpose of saving life only, that now, when merged into a military arm of the government, military training should be neglected and that the men be kept in comparative, if not absolute, ignorance of arms.

Should hostilities with a maritime nation eventuate, there will be greater necessity for an adequate coast patrol by the station crews than for the purpose of patrol in the rôle of savers of lives, due to possible enemy activities and a restricted commerce along the coast; but if the occasion were to arise for the utilization of the crews to save life, on occasion, would there be anything to prevent their performing a humanitarian duty? Absolutely, "No." The more versatile the men, the greater their individual efficiency and the units of which they are a part.

It has been argued by a very few that the benefit to be derived from developing the station crews along military lines would not be productive of results, because the force so trained would be a negligible one for the purposes of defence, due to the smallness of the crews. It is contended by a progressive element, however, that as the station crews comprise in the aggregate over 2000 men on a peace complement alone, it is a force worth training if for no other purpose than as a nucleus for an expanded force on shore, or, with a reserve to fill the stations upon the advent of war, the utilization of the station crews afloat in manning the ships. It may be that possibly a war must come before this will be brought home to us.

The point for immediate consideration with respect to the personnel of the coast guard appears to be as follows:

Is a body of 254 commissioned officers, each of whom has been educated at government expense, and approximately 5000 enlisted men, constituting a part of the military force of the country, to be increased in military efficiency, until the efficiency of the whole be raised to a high order or not? Assuming that the answer be in the affirmative, in what manner may the desired result be brought about?

From the viewpoint of a large number of officers of the coast guard, the following general scheme should be adopted, because there will be a time when the services of the officers and men of that corps will be urgently needed and because of the additional fact that from no other source, outside of the navy proper, can there be had a like number of officers of equal attainments and a warrant and enlisted personnel of like proportion trained to the sea and to military discipline, ready to automatically become a part of the navy, and to do the work demanded of them.

All officers of the coast guard, from first lieutenant down, should be given experience on board of capital ships, scout cruisers, destroyers, submersibles, and mine vessels; while the senior captains and captains of that service should be required to take the course at the Naval War College, as has been done by some voluntarily in years gone by.

Senior and junior officers should be encouraged to make a study of the war games by the correspondence method now in vogue in the navy, and all officers should be given an opportunity for

practical experience in the war games along the coast; for while the army and navy have enjoyed such an experience in common, no instance is on record where the coast guard has ever been able to profit from participation therein. The foregoing suggestions, if put into effect, would vastly increase the versatility of the officers of the coast guard, but prior to doing so, the commissioned personnel should be expanded commensurate not only with the size of the service, but the age and experience of the officers. At present, with an enlisted personnel of above 4000 men, there are but six senior captains (commanders); and the remaining commanding officers, those who do the real work at sea, enjoy the rank of captain (lieutenant commander), while adequate promotion in the junior grades is lacking.

It is proper to digress here to point to the fact that the present rank held by those afloat not only in the commissioned, but in the warrant ranks, not to mention the petty officer class, is entirely inadequate and must tend to prevent that full efficiency that is to be expected of the coast guard in the event of its becoming for the time being a part of the navy.

The handwriting is on the wall, and in the event of the service fulfilling the terms of the statute providing for its becoming a part of the navy, the lack of adequate rank will be a disturbing factor which will, by necessity, engage the attention of the Navy Department and legislation will have to be had. The writer is not gifted with clairvoyant powers and is as much at loss as to the ultimate destination of officers in the coast guard, in the event of mobilization and the duty each will perform, as are his fellows; but unless he is a false prophet, legislation must be had in order that they may do the work, and any legislation that may by necessity be enacted in war-time will be inadequate by reason of influences difficult to control. Therefore, measures should be at once taken to adjust the rank of officers by timely Congressional action, while at the same time adjusting the rank of warrant officers to meet impending conditions and to expand the petty officer class to make it a real incentive among the men.

During the months of July and August of each year, or if for only during one of those months, the crews of the coast guard cutters should be placed on board of naval ships in reserve, or ordinary, and, under coast guard officers, taken to sea and given

gunnery practice with heavy ordnance. On the initial cruise only, a naval gunnery officer should be detailed as an aid to the commanding officer, because of the naval officer's present knowledge of the naval ships and equipment. After that one cruise, the services of the naval man would not be required, as the coast guard officers would have absorbed the essentials necessary and the ships could be safely trusted in their care for all the purposes of training.

The practice suggested is essential for both officers and men and its necessity should be recognized. Would it not be desirable to have certain vessels of the navy set aside for manning by the coast guard in case of war? We of the coast guard know that results could be delivered, and the expediency of such a scheme should receive consideration.

Reflect for a moment on what is being done by the navy to advance the efficiency of the naval militia, and also the efforts that are being made to induce others from civil life to embark on cruises for training purposes and the degree of instruction given them. One wonders as to what the mental process must be of those who neglect the coast guard and compel it to work out its own salvation with practically no aid of any kind and with an appropriation that is almost pathetic, by reason of inadequacy, to meet even the ordinary running expenses of the service.

"It is the shots that hit that count," we are all taught that; consequently, the batteries of all cruising coast guard ships should be immediately increased to include 4-inch or 3-inch guns, according to the size of the vessel. Real enthusiasm will then be had on the range and the resulting scores will stimulate the crews; they will feel that they are in possession of guns which they may one day have to use for more serious purpose than mere range work.

Not long ago an officer of the navy advised against the expense of re-arming the coast guard cutters and suggested that "they could have recourse to rifle fire for offensive and defensive purposes." The writer again begs to say that he is no prophet, but advances the suggestion that should coast guard vessels be ever called on for defensive or offensive purposes, there will be a most urgent necessity for other than rifle fire in any actions in which they may engage.

A COAST GUARD RESERVE

For some time past, numerous officers of the coast guard have appreciated the advisability of a coast guard reserve.

Lieutenant C. C. Gill, U. S. Navy, has, in his able article in the September-October, 1916, issue of the PROCEEDINGS, dwelt on the necessity of such a reserve, and it is the first instance, to the writer's knowledge, where such a proposition has appeared in print or been considered outside of the coast guard. The army and navy reserves are not tangible assets of those services. Should we not immediately proceed to create for the coast guard a reserve that will be necessary in the event of war? In suggesting the cutter and station crews on a yearly training cruise, the matter of a reserve was in the writer's mind; the idea being that while the active crews were on that cruise, the cutters and stations would be manned by the reserves who should be given, during that period, a thorough course of drill.

The statutes provide that the period of enlistment in the coast guard shall not exceed a term of three years for each enlistment; while by regulations the present period of enlistment is but one year. In view of that fact, it should be required of all enlisted men that they go into the reserve at the expiration of their respective enlistments and there remain for a period of three years (a certain sum as retainer pay being allotted to them), but to be ready for a call to active duty upon occasion.

For the purposes of a reserve it should be divided into three classes: Class A, all those who have previously served in the coast guard afloat; Class B, all those having had previous service in coast guard stations only; Class C, those from civil life seeking enlistment and to be recruited wholly from among the fishermen along the coasts.

In war-time, temporary commissions in the regular coast guard should be given to the requisite number of warrant officers, professionally qualified; while provisional appointment as reserve officers should be extended to such of the enlisted personnel then in the service who demonstrate their qualifications, or who, being qualified, have already entered the reserve.

The service is essentially a seafaring one; consequently, all reserves should be seasoned men, able to stand the wear and tear of actual, hard duty at sea and with a full knowledge of service rigors.

THE MATÉRIEL

Some 20 years ago, because of the fact that no great demands were made upon their efforts, the vessels of the service were small, a policy even prevailing at that time "to increase the efficiency of the service by decreasing its tonnage." In 1897, however, a decided advancement was made in the construction policy and larger ships were built and their speed brought up to 17 knots when developing 2400 I. H. P.—the *Gresham* and *Algonquin* types. Yet the ships were coal burners, their bunker capacity limited in proportion to the fuel consumption, and there was a consequent restricted cruising radius. That policy was continued until 1902, when the last comparatively fast vessel, the *Mohawk*, was launched; and from then on, owing to the greatly increased cost of construction and the practical impossibility of obtaining adequate appropriations for ships, as well as for economical reasons, the speed and even the size of the vessels have decreased. True, under the last naval appropriation bill two larger vessels were obtained, but the fatal error was made in naming $350,000 for each, while $800,000 would probably have been appropriated at that time had it have been asked for, especially when it is understood that such a sum represents the cost of the new gun boats carried on that bill. Certainly, $500,000 is the least sum that should be allotted for a coast guard vessel of the cruising type in order to properly build and equip her; and $800,000 would be the maximum for an efficient vessel, because speed is such an important factor in the cruising cutter of to-day. It is a well-known fact that by reason of construction and lack of speed, the average coast guard ship lacks the military value it should have. In this progressive age, when even rural fire apparatus is being motorized in order to develop mobility, we regard with apprehension the slow coast guard cutter, a vessel both by term and occupation presumed to be gifted with the ability to "get there." In case of war if those ships are in the zone of activities, some at least will suffer by reason of their slowness.

If sufficiently large appropriations cannot be obtained for the construction of proper vessels under coast guard appropriations, the necessity for larger and faster ships—ones having real military value as well as the ability to perform their peace duties—demands that some other means be resorted to for securing the necessary funds than has been customary in the past, in order that

efficiency be not jeopardized. There appears to be two methods for accomplishing this: (a) The designs and specifications for coast guard vessels to originate in the Bureaus of Construction and Repair and Steam Engineering of the Navy Department, and appropriated for on the naval appropriation bills. (b) The building of a certain number of gun vessels for the naval service, and then turning a proportionate number of them over to the coast guard, fully equipped and batteried, to be used for the peace duties of that service, but ready for war duty when called on. The writer disclaims all originality for the latter suggestion, as it is understood to have been under the consideration of the naval general board. In it seems to lie the removal of a serious handicap, under which the coast guard has labored, and will continue to, for reasons here stated. It is accordingly commended to the consideration of every officer who may read this paper.

There occurs to the writer the desirability of building for the coast guard, in addition to the smaller type of vessel, about five really large ships—oil burners with ample steaming radius and with high speed. Such vessels could not only perform the function of scout cruisers, when serving as part of the navy, but would be specially adapted for the long, off-shore cruises made by cutters in search of derelicts, and on the ice patrol, etc., and they would be invaluable in case of assistance being needed by a vessel far out at sea. Such a cutter would have the ability to *go* and to keep the sea under all conditions.

The writer fully realizes that it will take money and, in some instances, special legislation to put into effect certain of the suggestions herein presented, while in others no legislation will be required. It would seem desirable that legislation be sought to give the committees on naval affairs of the respective houses jurisdiction over coast guard affairs. Where legislation is needed, immediate efforts should be made for securing the same, and there seems to be no more propitious time than the present, when the country is awakening to the necessities for national defence, to endeavor to place the coast guard, with respect to its military needs, in the same category with the army and navy, because in time of hostilities it must become a part of the latter service. The increase in the appropriation for the two last ships authorized has been denied, the bill appropriating the funds for aviation in the coast guard has been "laid on the table." Something is

wrong somewhere. It is contended again that the solution of the difficulty can only come through the naval committees having cognizance of coast guard appropriations.

WAR FUNCTIONS

As to the employment of the personnel and vessels of the coast guard when serving as a part of the navy, that matter will undoubtedly be attended to by the general board and, so far as the writer is aware, a tentative or complete plan for the utilization of the service may have already been completed. In a war of any magnitude, is it not possible that the personnel of the coast guard will be required for something other than mere harbor duty or the patrolling of mine-fields? Every officer of the navy has a fairly comprehensive knowledge of the part he will play in the eventualities of war, but it is not so with the coast guard officer, and, while standing ready, he can merely guess. No one seems to know why. True, the vessels will probably be utilized, but would it not be well were they to be manned by a reserve and the active crews released for other work? Who is to officer and man the auxiliary cruisers that would be brought into service? Might not that be a field for the endeavors of the coast guard? The Spanish-American War is not so far in the past as to have the experiences of that time entirely eradicated from the minds of the officers of the navy who were engaged therein, when there was the need for a personnel reserve—one that could stand the hardship of exposure in all weather at sea, a reserve that could be counted on for all-round efficiency and whose officers could be trusted with a deck and to command a division *at sea*.

CONCLUSION

In writing in the statutes that the coast guard shall, as a part of the military forces of the United States, operate as a part of the navy in time of war, or when the President shall direct, the lawmakers assumed a responsibility, as the agents of the people, to see to it that the coast guard is properly equipped and in other ways prepared to become an efficient naval unit when the occasion arises. There was also at that time a great degree of implied responsibility thrown upon the navy, to aid in every manner possible the increase of the military efficiency of the coast guard, which becomes a unit of the navy, as provided in the statute.

The extension to the coast guard of the privileges of the school of musketry at Winthrop and of those of the Aviation School at Pensacola is a step in advance. Unhappily, the former could not be utilized, because the coast guard had no money with which to send men to take the course (truly "the wolf is always scratching at the door").

However, it is hoped that advantage will be taken of the opportunities so far presented, also that other fields for progression will be opened up; but it is realized that in this matter the coast guard must assume its share of responsibility and not neglect opportunities that are presented to it, because to do so is to neglect a responsibility thrust upon the service as a whole.

There have been presented here suggestions that would seem to point towards increasing the efficiency of the coast guard, by extending means to meet the necessities; but we must search for every method within reach to accomplish that end. Amalgamation of the coast guard with the navy has been advanced by some as one solution of the problem that confronts us. In default of that, there has been suggested that the service amalgamate with the army. It is fair to assume that conditions cannot continue as they are for long.

There is no higher honor than to hold a commission in the coast guard of the United States, a service that has never been called and found wanting, and its traditions are founded on a history, the like of which any service might well be proud. Any suggestion for amalgamation, either with the army or navy, has for its object a single purpose—the increase of military efficiency for war.

The personnel has no "axe to grind" by amalgamation with either branch of the other military forces. Should an amalgamation eventuate in the future, it must be with the navy, rather than with the army. Opposition to amalgamation will undoubtedly come and on both sides and for reasons that, it is not necessary to mention, both services know; but it is to be regretted that opposition from any source should arise to oppose an amalgamation, whether it be as a separate corps or otherwise, because it is only by so doing that the coast guard can ever hope to reach that full degree of efficiency that is not only demanded of it, but that it deserves to have placed within its reach.

The hope of personal gain, service, jealousies, if present, reluctance towards losing a service once possessed, all should be

cast aside for the one objective towards which we strive—the efficiency of the coast guard as a fighting unit. In this the navy should be vitally interested.

A military service that operates under the Navy Department in time of military emergency should operate under that department in time of peace, and to deny that statement is to disregard military efficiency. The truth is so obvious as to preclude any need for discussion and it only remains to be said that if the coast guard would not be as efficient under the Navy Department as under the Treasury Department, and if it would not continue to become more so, then the service would be a signal failure from every viewpoint.

The writer personally favors the separate corps suggestion, because the personnel would remain intact and would bring to the navy quite as efficient a corps, within the scope of its endeavors, as the navy now enjoys in that superb body—the United States Marine Corps—which always has, and always will, shed a luster upon the department under which it operates.

The navy is a conservative service and the coast guard may be regarded as being ultraconservative; therefore, there should be a "getting together" for a meeting of the minds, to the end that each personnel may know the other.

Whether the coast guard will gain in the future the place due to it will, above all, depend on whether the personnel will resolve with open eyes to break with ideas of the past and devote itself to the tasks of the present without reserve, in all of which it must have the cordial and substantial support of the navy, which, in the belief of the writer, will be heartily accorded, whether the coast guard amalgamates with the navy or not, because the necessity for co-ordination will be realized.

The events of the immediate future can only be conjectured. Grave responsibilities may eventuate at any time and come when least expected.

The coast guard is proud of its personnel and knows that if given the opportunity it will prove its worth and mettle, because there are potentialities therein that are unknown to the outsider. The point is, when the hour for action strikes, will there be co-ordination or a lack of it, and if the latter, to whom, or to what group, will the responsibility be charged?

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

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Life, regular and associate membership, 5784.

New members: 119. Resignations: 98.

Deaths:

Commander E. G. Blackeslee, U. S. N.
Ensign A. W. Lancashire, U. S. N. R. F.
A. Paymaster B. L. Steele, U. S. N. R. F.
Mr. William L. Oliver.

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is submitted. Twenty copies of reprints are furnished authors free of charge.

Illustrations Authors of articles submitted are urged to furnish with their manuscript any illustrations they may have in their possession for such articles. The Institute will gladly co-operate in obtaining such illustrations as may be suggested by authors.

Original photographs of objects and events which may be of interest to our readers are also desired, and members who have opportunities to obtain such photographs are requested to secure them for the Institute.

Notice Whole Nos. 145, 146, 147, 149, 155, 166 and 179 of the PROCEEDINGS (March, 1913, June, 1913, September, 1913, January-February, 1914, January-February, 1915, and November-December, 1916, January, 1918) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

ANNAPOLIS, MD., MARCH 15, 1919.

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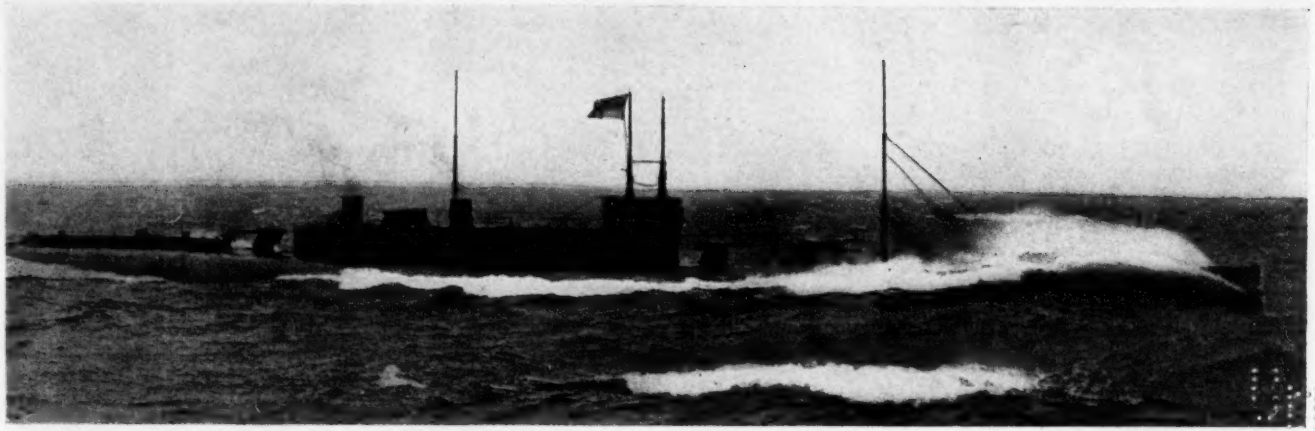

NEW TYPE OF SUBMARINE 340 FEET IN LENGTH DOING 24 KNOTS UNDER STEAM. NOTE THE THREE 4-INCH GUNS, TWO FORWARD AND ONE AFT; ALSO THE TWO SMOKESTACKS, WHICH FOLD DOWN WHEN THE SUBMARINE SUBMERGES. DISPLACEMENT SUBMERGED 2700 TONS, SPEED 10 KNOTS.

PROFESSIONAL NOTES

PREPARED BY

COMMANDER S. A. TAFFINDER, U. S. Navy

GENERAL ARRANGEMENT

VESSELS BUILDING. NAVAL POLICY. MATÉRIEL. PERSONNEL. OPERATIONS. MERCHANT MARINE.

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AUSTRO-HUNGARY

AUSTRO-HUNGARY'S DIMINISHED MERCHANT FLEET.—At the outbreak of the war Austria possessed 186 ocean-going ships, aggregating 757,043 gross tons. In addition, there were under the Austrian flag 25 vessels employed in short sea trips and 163 miscellaneous craft engaged in the coastwise trade, making a total of 374 vessels with an aggregate tonnage of 812,343 gross tons.

Of the just enumerated merchant tonnage 156,113 tons was captured, 113,053 tons sold to foreign owners, and 46,164 tons sunk by enemy action during the course of the war. The aggregate loss amounted to 315,330 tons. New ocean-going tonnage constructed in the same period amounted to 63,344 tons. When hostilities closed, therefore, Austria's merchant fleet had diminished to 296 ships of a gross tonnage of 560,357 tons.

In the case of Hungary the country had on August 1, 1914, only 69 ocean-going ships of 211,621 gross tons, 42 short sea-going vessels of 3690 tons and 62 coasting craft of 18,411 tons, or a total of 173 ships of 233,722 tons. While hostilities lasted ocean-going vessels of 51,391 gross tons were captured and vessels of 7049 tons sunk through enemy action. Seven ocean-going ships of 25,289 tons were sold to foreigners. From this total tonnage of 83,729 tons lost, there should be deducted 6152 new tonnage constructed. At the date of the signing of the armistice Hungary's merchant fleet consisted of only 109 ships of 156,145 tons.—*Nautical Gazette*, 8/3.

FRANCE

FRENCH DESTROYER DAMAGED.—Paris, Jan. 7.—The French destroyer *Enseigne Henry* was damaged in the Black Sea on the morning of January 1 as the result of a mine explosion. She was able to reach Constantinople under her own steam. Four seamen were killed by the explosion.—*London Times*, 8/1.

FRENCH NAVAL LOSSES IN THE WAR.—A full list of the French naval losses in the war, which has been published, includes four battleships, the *Bouvet, Suffren, Gaulois* and *Danton;* four armed cruisers, the *Leon Gambetta, Amiral Charner, Cleber* and *Dupetit Thouars,* and one fast cruiser, the *Chateau Renault.* There were, besides, fourteen destroyers, eight torpedo boats and fourteen submarines lost. One of the submarines, the *Duric,* was refloated by the enemy, but was subsequently recovered. The minor ships which were sunk were five auxiliary cruisers, four gunboats, 72 submarine chasers, one sloop and seven small craft.

The loss in tonnage was 110,000 tons, against 550,000 tons for England, 76,000 tons for Italy, and 17,500 tons for the United States.—*Nautical Gazette.*

WALSER'S HYDROPHONE.—The fundamental fact upon which Lieutenant Walser built is that sound, like light, is refracted on passing from one medium into another. We are accustomed to diagrams which assume that the complex of light from a given object consists of a number of component waves, which may be taken to be parallel if their source is sufficiently remote, which remain parallel so long as no obstruction is interposed in their path, and which are bent as soon as they are called upon to enter a medium of different density from that in which they were propagated. And it is just so with sound waves.

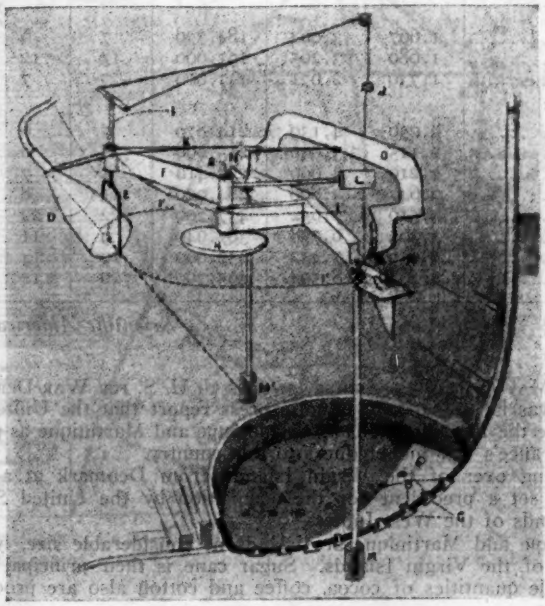
Walser therefore interposed, in the path of sound waves, a sort of acoustic lens. Just as in the case of light, this causes the individual waves which make up the sound complex from a given source to come to a focus, with the double effect of strengthening them and isolating them from the sounds that proceed from other sources. In fact, the several sources of sound give rise to as many foci, of which the geometric locus can be determined by calculation; and in the same way, from the position of the sound focus which pertains to any particular source of sound, the position—or at least the direction—of that source can be calculated.

Once this general idea had been formulated, it remained for the lieutenant to work out the practical details. As finally adopted and used with huge success in the detection of submarines, the acoustic lens was in the form of a spherical segment *A,* set into the side of the chaser or destroyer. In the bulging surface of this are a series of circular holes *B,* each filled with a sensitive vibrating plate *C.* The effect is to focus all sounds received; and the focal points all lie on a circle *I,* whose position, of course, depends upon the radius of the lens segment and other factors which can be controlled. There are two of these lenses on each vessel, one to port and one to starboard. The two give upon a single cabin, which of course extends the entire width of the ship, and is well insulated against sounds at all points save the two lenses. The observer is seated in the center of the cabin, with a listening helmet to which are attached two ear-trumpets, of which only one is shown at *D* in our diagram. One trumpet, of course, pertains to the port lens and one to the starboard.

The trumpet *D* is carried on a fork *E,* which is moved from the wheel *H* through the arm *F* and pivot *G.* The wheel *H* is connected with the rotating drum that appears in the general view; and the mechanism is so adjusted that as the operator turns the handle of this drum, the two trumpets revolve about the respective focal circles of the sounds received.

The counterweight *J* and cord *K* hold the trumpet in a position where its axis is constantly directed toward the center of the spherical lens. The counterweight *L* maintains the equilibrium of the mobile arm *F.* The counterweights *M, M',* cause this arm to oscillate about the pivots *N, N',* in such manner as to counterbalance the effect of the ship's pitching and keep the mouth of the trumpet always in the same horizontal plane. The entire apparatus is supported by the frame *O.*

In using the apparatus, the observer can hear a given sound, not only when the trumpet is precisely centered at the focal point of that sound, but when it is anywhere in the neighborhood of that point. He hears it loudest and clearest, however, when the axis of the trumpet passes through the focus, so that the trumpet is centered about the focus. He explores the field by keeping the trumpet continually in motion; and he locates every suspicious sound by carefully bringing the trumpet to the position where it is loudest and clearest. The instrument has been previously calibrated, so that when he succeeds in getting the maximum intensity for a given sound, he reads the direction of its origin on the scale that runs



WORKING PARTS OF THE HYDROPHONE.

about the edge of the drum. The distance is then estimated roughly by taking account of the intensity of the sound at its maximum; and it is then easy to steer a straight course for the source—and, if the latter be a submarine, to pass directly over it with mathematical accuracy and drop sudden death upon it.

The first successful experiments with a more or less definite model were made on March 31, 1917. After that, progress was slow, both in the way of removing the last technical obstacles, and in the more difficult business of convincing the "appropriate authorities" that here was something good. All these difficulties were surmounted, however; the apparatus was installed, and on March 16, 1918, it received its baptism of fire. Its success was immediate; and from that date to the end of the war it made a very large contribution to the nullification of the submarine menace.—*Scientific American*, 8/3.

There have been many accounts written of the work done by the French naval pilots on various occasions, but never has there appeared a comprehensive "resumé" of their achievements. For this reason, the following table which we are able to reproduce through the courtesy of the French Ministry of Marine, is of especial interest:

ACTIVITY OF THE SEAPLANES, OCTOBER, 1917–AUGUST, 1918

Month	Number of Flights made	Hours of Flight	Distance covered (miles)	Submarines sighted	Submarines attacked	Mines discovered
1917						
October	1,667	3,094	184,730	7	6	..
November	1,680	3,265	191,000	15	12	..
December	1,730	2,671	147,000	7	7	..
1918						
January	2,236	4,139	214,870	7	6	3
February	2,115	3,690	215,000	8	6	4
March	2,210	4,099	237,410	5	7	8
April	2,647	4,808	284,920	11	8	8
May	3,510	7,652	437,200	22	22	10
June	3,365	6,758	387,940	9	11	9
July	3,959	7,432	432,000	19	14	12
August	4,268	8,594	495,700	20	12	6

—*Scientific American*, 8/3.

FRANCE MAY CEDE WEST INDIES ISLANDS TO U. S. FOR WAR DEBT.—Confirmation was lacking of the London press report that the United States is to receive the French islands of Guadeloupe and Martinique as part payment of France's war indebtedness to this country.

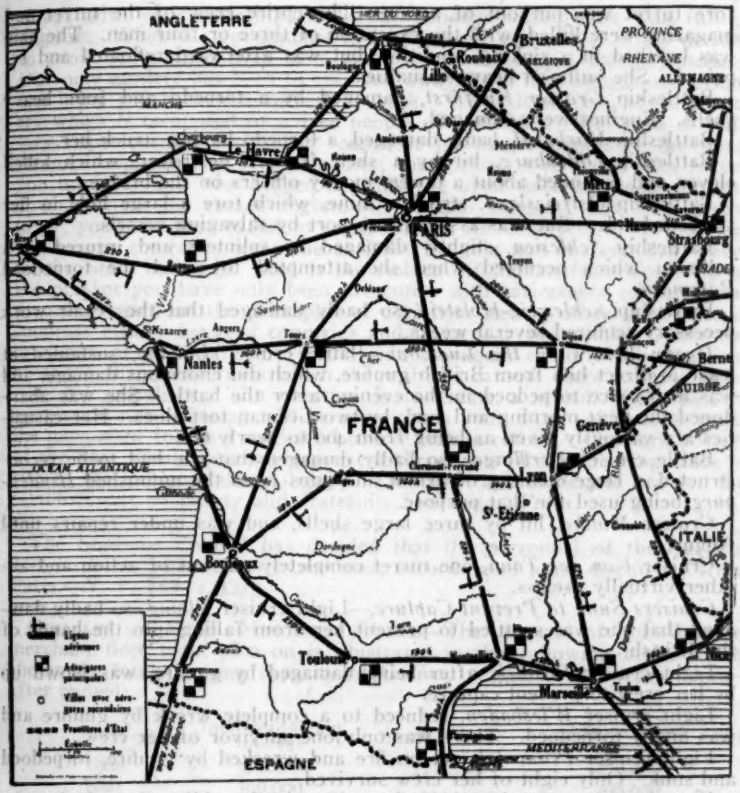
The taking over of the Virgin Islands from Denmark at a cost of $25,000,000 set a precedent for the acquisition by the United States of title to islands of the West Indies.

Guadeloupe and Martinique are islands of considerable size, lying east and south of the Virgin Islands. Sugar cane is their principal product. Considerable quantities of cocoa, coffee and cotton also are produced on both islands.

The suggestion regarding Guadeloupe and Martinique appears to be taken seriously. It was pointed out that the cost price of the two islands would not make more than a small dent in the financial obligations of France to the United States.

Naval experts were not particularly enthusiastic when their attention was called to the London report, saying Guadeloupe and Martinique would be of little value to the United States. Each island has a fairly good port, but neither is equal to the port of Charlotte Amalie in the Virgin Islands.

The ceding of Martinique and Guadeloupe would leave as the only French possession in the western hemisphere French Guiana. If that were included it would mark the first foothold of the United States on the South American mainland. This would naturally disturb the South American republics, and as the policy of this country is to calm apprehension in that part of the world, the idea makes no hit with American diplomats.—*Baltimore Sun*, 10/3.



COMPREHENSIBLE PLAN OF THE PROPOSED FRENCH AERIAL MAIL ROUTES, PREPARED BY THE CHIEF OF THE FRENCH AERIAL MAIL SERVICE.

GERMANY

SHOW 260 SHIPS IN JUTLAND BATTLE.—*German Vessels Riddled—Berlin Statement of 3076 Loss in Personnel Appears to be Confirmed.*—London, Feb. 21.—There is no reason to doubt the substantial accuracy of the German official account of the losses suffered by the German fleet in the Jutland naval battle, May 31, 1916, it is learned officially by Reuters. The German figures published June 16, 1916, showed that the casualties to the fleet's personnel were: Officers: killed or missing, 172; wounded, 41; other ratings, killed or missing, 2414; wounded, 440. Total, 3076.

Official details of damage done to individual vessels follow:

Battleship *Koenig,* struck about fifteen times and badly damaged. The ship went down by the head until her forecastle was only six and a half feet above water. The crew of the forward torpedo tube was imprisoned until the ship was placed in dry dock on June 5. Four fires were started on the ship and Admiral Hehnke was wounded in the head. The casualties on board were heavy.

Seydlitz Struck by 28 Shells.—Cruiser *Seydlitz* hit by 28 shells and one torpedo from a British destroyer. Her forecastle was riddled and her

fore turret was put out of action. The entire crew of the turret and magazine were killed, with the exception of three or four men. The ship was beached in a sinking condition, but was afterward refloated and repaired. She suffered heavy casualties.

Battleship *Grosser Kurfürst*, damaged by a torpedo and four heavy shells. Engines were damaged.

Battleship *Markgraf*, badly damaged, a torpedo having struck her.

Battleship *Oldenburg*, hit by a shell from a destroyer, which killed eleven and wounded about a dozen, mostly officers on the bridge.

Battleship *Ostfriesland*, struck a mine, which tore a large hole in her starboard side. She was assisted into port by salvaging vessels.

Battleship *Schlesien*, slightly damaged by splinters and injured in a collision which occurred when she attempted to avoid the torpedoed *Pommern*.

Battleship *Schleswig-Holstein*, so badly damaged that the repair work necessary required several weeks.

Heavy Losses on the Luetzow.—Battle cruiser *Lützow*, sustained at least 40 direct hits from British gunfire, which did enormous damage, and was also twice torpedoed in the evening after the battle. She was abandoned the next morning and sunk by two German torpedoes. Her casualties are variously given as being from 400 to nearly 600.

Battle cruiser *Derfflinger*, so badly damaged that she had to be reconstructed, a large quantity of armor and guns from the unfinished *Hindenburg* being used for that purpose.

Cruiser *Moltke*, hit by three large shells, and was under repairs until August.

Cruiser *Von der Tann*, one turret completely put out of action and another virtually useless.

Cruisers Sunk to Prevent Capture.—Light cruiser *Elbing*, so badly damaged that she was scuttled to prevent her from falling into the hands of the British.

Light cruiser *Rostock*, after being damaged by gunfire, was blown up by her crew to prevent capture.

Light cruiser *Wiesbaden*, reduced to a complete wreck by gunfire and was finally torpedoed. There was only one survivor of her crew.

Light cruiser *Frauenlob*, set on fire and wrecked by gunfire, torpedoed and sunk. Only eight of her crew survived.

Five destroyers are known to have been sunk, while others had to be towed into port.

A complete record of the British forces engaged in the battle shows 24 dreadnoughts, 8 battle cruisers, 18 cruisers, 18 light cruisers, and 78 destroyers. The German force included 21 battleships, 16 cruisers, and 77 destroyers. It is clearly established, however, that of the ships which actually came into action the preponderance of force was held by the Germans.—*N. Y. Times.*

729 KILLED AND 1,754 INJURED BY ALLIED AIR ATTACKS.—Copenhagen, March 16.—Seven hundred and twenty-nine persons were killed and 1754 injured in aerial attacks by Allied forces in German territory up to November 6, 1918, according to official figures made public in Berlin.—*Baltimore Sun*, 17/3.

THE RETURN OF THE TROOPS.—*An Address by the Commissary of the People, Haase.*—Berlin, December 12.—At the arrival of the divisions of chasseurs made up of troops from all parts of Germany, Haase, the commissary of the people, held the following address near the Brandenburg gate:

"Soldiers, the council of commissaries and the government of the socialist republic greet you in the most cordial manner. We have sympa-

thized with your sufferings and your fatigues during this war full of anguish. When the government took the power in hand, it firmly decided to avoid prolonging, even by a single hour, the stupid human butchery. Our only anxiety has been to tear you away from this complicated drama and bring you back to a successful work. We welcome you to this country which is composed of a free people of comrades. The yoke of military imperiousness no longer reigns, it no longer oppresses the unrestrained expansion of free thoughts; the former sovereigns, who forced you into war and who heaped up suffering upon suffering upon you, are down. Under the cursed régime our popular existence has been devastated; you have been called to collaborate in its resurrection. In the barracks your comrades wear the socialist insignia and the red flag waves on the State buildings. Red is the emblem of human fraternity. Up to the present you have only been presented with caricatures of socialism: a society based on the principles of socialism has no other aims than to suppress rivalry between countries and make war impossible. After the teachings of this war who would want to again excite brother against brother? From the ruins which the war has caused, there arises a great task for socialism. The question is to create a world where neither oppression nor suffering will be seen. It is your duty, soldiers, to make the movement follow a successful course rich in results. The dark powers of the past should nevermore prevent the efforts of the laboring class to rise to the level of human dignity. Our most ardent desires are for the establishment of liberty and fraternity."—*German Press.*

The Supreme Council has decided that the personnel of the German fleet is to be restricted to 15,000 men, according to press dispatches from Paris.—*N. Y. Times,* 12/3.

GERMANY'S FALLEN MERCHANT FLEET.—The growth of the German merchant fleet from 1800 on is illustrated in the following table, which shows the total carrying capacity of German vessels in the years hereinafter named:

Year	Total deadweight tonnage	Steam tonnage	Sailing vessel tonnage
1800	570,000	.....	570,000
1825	300,000	.....	300,000
1850	750,000	10,000	740,000
1875	1,650,000	333,000	1,317,000
1890	2,020,000	965,000	1,055 000
1910	5,870,000	5,105,000	765,000

Even more striking than the increase in the country's shipping has been the gain in the value of Germany's foreign trade. From 1830, or when comparative statistics first became available, the total foreign trade of the territory embraced in the former German Empire has been estimated as follows in millions of marks:

Year	Total trade	Marks per capita
1830	740	25
1840	1,320	41
1850	2,100	60
1860	3,200	84
1870	4,240	106
1880	5,820	128.9
1890	7,782.5	156.5
1900	10,795.6	191.5
1910	16,408.8	252.9
1913	20,866.8	

The remarkable expansion of Germany's foreign trade after the formation of the Empire is further brought out in the next table which shows both the quantity and the values of the goods exported and imported in the years named:

Year	Weight in thousands of tons	Per head	Value in millions of marks	Marks per head
		IMPORTS		
1872	13,325	0.32	3,464.6	83.7
1910	62,995.2	0.97	8,934.1	137.7
		EXPORTS		
1872	10,049.7	0.24	2,492.2	60.2
1910	48,705.3	0.75	7,474.7	115.2

Coincident with the growth of the country's foreign trade, Germany's merchant fleet nearly doubled in size between 1836 and 1849. Imports increased faster than exports. In 1847, the Hamburg-American line was started with a capital of 300,000 marks. Its first vessels were sailing ships, the pioneer unit being the *Deutschland* of 717 tons which carried 220 passengers. The same year witnessed the departure of the first steamer from New York to Bremen. This vessel named *Washington* flew the American flag and, together with its sister ship *President*, was owned by a syndicate styled the Ocean Steamship Navigation Company, which had been formed by the State of Bremen, some neighboring German states, and certain prominent Germans in New York. This company was the first to establish regular steamship communication between the continent of Europe and the United States. Thanks to the large immigration to America, these paddle-wheel steamers proved profitable for a time. When the United States Government failed to renew its subsidy, however, the company went into bankruptcy in 1857. The North German Lloyd Company was thereupon formed to take its place.

Previous to the repeal of the British Navigation Act in 1849, colonial products like cotton and sugar were imported mostly by way of Great Britain. After the last-named year, however, these articles could be brought to Germany direct, which resulted in an increase of German overseas trade. About this time iron ships were first built. German shipping interests established lines of coastal steamers from Lübeck to Copenhagen and Petrograd and from Hamburg to Hull and London. The first German ocean going steamer, the *Helene Slomann*, was dispatched from Hamburg to New York in 1850, but was unfortunately lost on her third voyage with all on board.

Following the discovery of gold in California, in 1849, ships sailed from Hamburg to California laden with gold-seekers. As no return freight was to be had along the American Pacific Coast, these ships crossed over to Asia in search of return cargoes. Whereas only ten Hamburg ships put into the port of Hongkong in 1850 with a total carrying capacity of 4500 tons, 315 such ships with a carrying capacity of 94,000 tons entered the same port in 1864.

From 1870 on, the number of German sailing vessels began to decline. In 1877 Rostock had 356 sailers of 100,000 gross tons. By 1903, this same fleet had shrunk to 28 vessels of 17,000 gross tons, only eight of which were sailing vessels. Papenburg on the Ems, Germany's only catholic seaport, possessed in 1869 190 sailing vessels. This number had declined to 23 in 1900 and just prior to the outbreak of the war one solitary sailing vessel constituted Papenburg's entire merchant fleet. Of the 990 barks belonging to the German merchant fleet in 1876 only 23 remained when the war broke out. As to the 643 brigs in existence in 1876, not one remains to-day. Between 1875 and 1895, German merchant ships diminished from 4800 to 3600.

Elsewhere will be found an account of the rise and progress of the Hamburg-American and North German Lloyd lines. Next in importance to these great German shipping combinations is the Hamburg-South American line which was founded in 1871. The next year the Kosmos line was started to the west coast of South America. 1882 witnessed the commencement of the Woermann line service to Africa. Six years later came the German Australian Steamship Line to be followed in 1890 by the German East African Company.

At the outbreak of the war, Hamburg and Bremen were the home ports of 85 per cent of all German merchant tonnage. While half the world's merchant shipping was owned by liner companies in 1914, four-fifths of Germany's merchant shipping was thus controlled. As admitted by Lord Inverclyde, Germany was Great Britain's greatest rival from the liner point of view before the war. The German companies were showing great enterprise in the construction of large, fast, and luxurious liners when the war broke out. These vessels were, if anything, more sumptuously equipped and fitted with modern appliances, etc., than corresponding British liners in the same trades.

On June 30, 1914, the tonnage of the various German liner fleets was reported as follows:

Company	Gross tons
Hamburg-American Line	1,093,000
North German Lloyd	716,000
Hamburg-South Amer. Line	268,000
Hansa Line	339,000
German Australian Line	264,000
Kosmos Line	179,000
Roland Line	75,000
German East Africa Line	105,000
Woermann Line	112,000
Hamburg-Bremen-Africa Line	43,000
Total	3,194,000

Whether German Shipping will recover from its war losses and again become an important factor in the carrying trade of the world is as yet problematical. Its future is entirely dependent on what will take place at the Peace Conference. If Germany is stripped of her shipping and her vessels excluded from the high seas as proposed in certain quarters, very few ships will be found afloat hereafter flying the German flag. In that event, German shipowners will in all likelihood place their ships under a neutral flag.—*Nautical Gazette*, 15/2.

GREAT BRITAIN

BRITISH NAVAL ESTIMATES.—The British naval estimates, issued tonight, provide for a personnel of 280,000 and a total expenditure for the year of £149,200,000. This sum includes £68,000,000 for ship building, repairs, and maintenance.—*N. Y. Times*, 8/3.

STEAM SUBMARINES.—"The 4th August, 1916, saw the commissioning of a boat which was a revolution in submarine design. This was the first K-boat. This class was designed for the expected fleet action: their qualities were to be—that they should have several knots in hand over the speed of the battle fleet, that they should be seaworthy and able to cruise with the fleet, and that they should have the necessary submarine qualities to enable them to deal with the high sea fleet when it should be met. These qualities they have; but it is regretted that the enemy gave them no chance of trying their luck in action. They were used on patrol during the long wait for their

"Day," and their experiences on patrol and when at sea on the periodic occasions when the fleet went hurrying out in reply to reported enemy activity, have given invaluable data for future construction of large and fast submarines. These boats are of 1880 tons (surface) and 2550 tons (submerged) displacement. They have a speed of slightly over 24 knots on the surface, can carry a good gun-battery if required, and their hulls, being low and well stream-lined, and their torpedo armament powerful, they can act both as destroyers by night or as submarines by day. These boats have a battery capacity sufficient for a day's fleet battle, but no more. They may be described as having great strategic speed and capacity, but small tactical radius; that is, they can get to the place where they are wanted quickly, but are circumscribed in their capabilities of remaining submerged in that spot for long, or of moving fast submerged for more than one attack without rising to recharge their batteries. In submarine design as well as in that of surface ships, you can't have everything; each type is a compromise."

The foregoing description omits to mention one of the most interesting features of the "K" class, viz., the installation of steam machinery for surface propulsion in place of the internal combustion engines fitted to all previous British submarines. Beyond the fact that geared turbines are employed in conjunction with oil-fired boilers, no details of the machinery can be given, but we understand that the installation as a whole closely resembles that of a modern torpedo-boat destroyer. Auxiliary engines of the internal combustion type are fitted in order to charge the accumulators for submerged cruising. When running on the surface a "K" boat may be identified by her two small funnels, which are folded back along the superstructure before diving. Other data relating to this class are as follows, all figures being unofficial and only approximate: Length about 330 feet, beam 33½ feet, draft 20 feet, armament eight torpedo tubes, of which four are on the beam; four medium quick-firing guns, including two on high angle mounts for use against aircraft. In this class of boat the living quarters leave nothing to be desired from the points of view of comfort, convenience, and health. The commanding officer has his own cabin, there is quite a roomy ward-room for the officers, and there are separate messes for the petty officers, engine-room artificers and seamen. As first commissioned the boats had low bows, but subsequently they were raised to improve the sea-going qualities. Vessels of the "K" class have a very extensive radius of action on the surface, in which respect they are equal, if not superior, to the German "submersible cruisers." The experiment of equipping them with steam machinery was naturally condemned by Diesel enthusiasts as a retrogressive step, which, nevertheless, appears to have been justified by the behavior of these vessels on active service. It is interesting to note that one of the most successful submarines—judged by her war record, which includes two "mentions" in orders of the day—in the French Navy is the *Archiméde,* which is also propelled on the surface by steam, her plant consisting of two sets of triple-expansion engines of 1700 indicated horsepower. It is generally understood that about 22 K-boats have been built, though the actual total may be larger.—*The Engineer, 21/2.*

"BLISTERS."—The following notes on the "blister" protection fitted to vessels of the British Navy may be of interest. In its earliest form this system was first applied to four old cruisers, *Edgar, Endymion, Thesus,* and *Grafton.* Curiously enough, more than two years elapsed before a ship so fitted was attacked by hostile submarines, and it was not until June, 1917, that the efficacy of the "blister" was tested. In that month the *Grafton* was torpedoed squarely amidships. A large hole was blown in the bulge, but the ship herself was practically undamaged. On subsequent occasions several of the monitors were torpedoed, but in no case with fatal, or even with serious results. Recognizing the futility

of torpedoes against these vessels, the Germans evolved a new weapon, from which they expected better results. This was the electrically-controlled moon-boat, the advent of which was duly reported in an official communiqué during 1917. Capable of very high speed, loaded with a heavy charge of explosives, and under perfect control from a shore station, this novel instrument threatened to become more formidable than the conventional torpedo. One of them struck the *Erebus*, demolishing part of the "blister." An examination showed, however, that the injury was less serious than had been feared, and the *Erebus* was soon in service again. After this experience all the monitors were fitted with a strong guard rail running round the bulge, and thereafter the electric boat "torpedoes" appear to have been less dangerous.—*The Engineer*, 14/2.

U-BOATS SOLD FOR JUNK.—*Purchasers of 47, Held by British Promise to Break Them Up.*—A number of German submarines lying in a British port are to be handed over to the Allied governments, some being sent to Italy, Japan, and other countries. Forty-seven submarines, of all sizes, up to the big ocean-going submarines, have been sold under the condition that they be broken up. The Admiralty will first remove their engines.—*N. Y. Times*, 5/3.

GERMAN ANTI-AIRCRAFT DEFENCES.—Now that the cessation of hostilities against the Central Powers permits the issue of sundry details concerning the work of the Royal Air Force against the German defences in Belgium the public will be able to realize better than during the actual course of the war the tremendous opposition which our airmen had to face in the performance of their duties. During the war no less than 30,000 bombs were dropped by our Dunkerque squadron—principally upon Ostende, Bruges, and Zeebrugge, which were the bases of the German destroyer flotillas operating off the Belgian coast, and contained their submarine depots, and all our aerial operations against this coastal sector were carried out in the teeth of a powerful and carefully-organized system of anti-aircraft defences. The number of anti-aircraft batteries was very large and included some guns of 8-inch caliber. One well-known gun at Westende could throw a shell up to 22,000 feet, and the local defences, both fixed and mobile, were formidable to a degree. To take one example of a closely defended locality, there were concentrated at Bruges alone within a small radius more than 50 powerful searchlights, over 50 guns of various calibers, about 40 kite balloons carrying nets, and innumerable machine-guns and tracer pom-pom guns. Yet, in spite of the intensive barrage which the enemy could put up, Bruges was on one occasion bombed from a height of only 200 feet.—*Army and Navy Gazette*, 8/2.

SHIFTS ON GERMAN FLEET.—*Britain May Let France and Italy Have Some Ships, but Sink Her Own.*—A change in the attitude of the British Government regarding the plan to sink interned German warships has been noticed since the return of Premier Lloyd George to Paris. It now appears likely that instead of the German craft being sunk Great Britain will be willing to permit France and Italy to keep some of the ships, but will consent to sink her own allotment.

In this way, it is said, Great Britain would relieve the United States of the necessity of carrying out her projected great naval building program, which, it is understood, was based on the intention of preventing any one nation from having such a predominant navy as would give her control of the seas against the powers of the League of Nations.

The addition of some of the German warships to the French and Italian navies would not sensibly disturb the balance of naval power, excluding Austria and Germany.

The desire of American naval experts that the German ships shall be eliminated, it is said, is based on considerations of economy, as they hold

that if the German ships are given to Great Britain in the proportion proposed the United States would be compelled to spend $1,000,000,000 to maintain her place in the naval lists.—*N. Y. Times*, 11/3.

AERONAUTICS.—Although the government still finds it necessary to place a ban on civilian flying, several more or less unofficial performances during the past month are worthy of note. Of them one of the more technically interesting was the ascent on the 2d of a British machine from a point near Ipswich with the pilot, Captain Lang, R. A. F., and an observer, Lieutenant Blowes, to a height of 30,500 feet, thus establishing a world's altitude record for an aeroplane. The machine used was a DeHavilland 9 biplane, made by the Aircraft Manufacturing Company, and equipped with a Napier "Lion" engine developing 450 horsepower. The first 10,000 feet was accomplished in 6 minutes 18 seconds, the first 20,000 feet in 19 minutes 40 seconds, and the maximum of 30,500 feet in 66 minutes 55 seconds. The oxygen apparatus and the electrical heating apparatus both gave trouble, and at the maximum height the engine stopped running by reason, it is stated, of the failure of the small propeller-driven petrol and oil pumps. The feat was accomplished, it is interesting to note, in a wind blowing, on the ground, at 35 miles an hour. Another notable performance was the flight on the 18th of a large Handley-Page machine from Belfast to Sheffield, and thence at a later date to the east coast of England. The machine was fitted with four Rolls-Royce engines, developing a total of 1600 horsepower, and was built by Messrs. Harland and Wolff. It was one of a number constructed for the bombing of Berlin, and was of the same design as the machine which in November flew over London with forty passengers on board. Fully loaded it weighs over fourteen tons, and carries sufficient fuel for a flight of 1500 miles. On the journey from Belfast the machine carried a crew of seven with half a ton of luggage, the pilot being Mr. C. B. Prodger, the well-known aviator. The weather was bitterly cold and windy at the start, and later, especially over the Midlands, heavy banks of fog were encountered. The journey was made via the Isle of Man, Blackpool, Preston, and Manchester, and was commenced a few minutes after noon. At 3.25 p. m. the pilot brought the machine to land at Sheffield, having spent 25 minutes in the endeavor to find the aerodrome. The journey of 300 miles was thus accomplished at the rate of 100 miles an hour. During much of the course the ground was invisible and the pilot had to steer by his compass. Bad weather prevented the continuation of the journey to the east coast for some days—it had been intended to accomplish the whole trip in one stage—but eventually the remaining portion of the journey, a course of 130 miles, via Lincoln, Skegness, and the coast line southwards, was successfully achieved, in spite of gusty winds, storms and low-lying mist, the time taken being one hour forty minutes.—*The Engineer*, 7/2.

8000 GERMAN PLANES BAGGED.—*Britain Reports 2800 of Her Aircraft Were Lost.*—London, March 13.—During the war 8000 enemy airplanes were shot down by the British air forces, while 2800 British air machines were missing, Brig.-Gen. J. E. B. Seeley announced in the House of Commons to-day in introducing the army's estimates of £66,500,000. General Seeley said that if the war had continued the estimate would have been £200,000,000.

When the armistice was signed, he added, England was turning out 4000 airplanes a month and had 200 squadrons in commission compared to six at the beginning of the war.—*Baltimore Sun*, 13/3.

THE CLYDE-BUILT AIRSHIP "R.-34."—The new Clyde-built airship *R.-34*, says *The Glasgow Herald*, is expected to have a speed of 80 m. p. h. to 90 m. p. h. under average weather conditions, and to be capable of cross-

ing the Atlantic from Scotland to New York and returning without stopping. She is 670 feet in length, 79 feet in diameter, and of 2,000,000 cubic feet capacity. She has a lifting power of 50 tons, and a total horsepower—in five engines—of 1250. Four cars or gondolas are suspended from the framework, the forward being the navigating or control car from which the vessel is operated, and in which there are also the wireless telegraphy and wireless telephony cabin and the ballast and bomb controls. From each car there runs to the top of the vessel a wire ladder, which leads also into a corridor that runs all the length of the ship. At the extreme stern, near the rudder and the elevating planes, there is a machine-gun platform, while right on the top there is another platform for machine guns and also for a 2-pounder gun. There are water ballast tanks having a capacity of 2000 pounds, and petrol tanks capable of carrying fuel sufficient for eight days' continuous running. All these tanks can, if necessary, be released at any time and dropped clear of the ship. If caught at sea in fog the *R.-34* can stay in the air for three weeks at a time, or can throw out a sea anchor and ride out a storm, keeping in touch with the land by wireless, or asking for whatever assistance may be desired.—*Engineering*, 21/2.

A BONUS FOR THE NAVY.—That the Admiralty have officially admitted the pay of the officers and men to need "thorough and expeditious revision" should go far to quiet the unrest in the navy. It will be held satisfactory also that at the same time this admission is made notice is given of a temporary increase, or bonus, pending the conclusion of the investigations now being held in the matter. The official announcement adds that "this bonus must not be taken as representing the increase which the board may ultimately consider necessary before they can be satisfied that the officers and men of the Naval Service are receiving that just and equitable remuneration which their services so well merit." Assuredly the increase now given does not nearly meet the standard which the officers and men themselves consider an adequate remuneration for their services, nor in the case of the men does it meet the claim they have made as a body in public meeting. Apparently not less than 50 per cent on the substantive pay of the officers, and 100 per cent on that of the men will satisfy their own expectations of equitable treatment. It is much to be regretted that an advance was not made before the men began to agitate for it, and whether the board have taken an altogether wise course in dealing with the movement only time will show.—*Army and Navy Gazette*, 11/2.

LORD JELLICOE'S CASE.—By Arthur Pollen.—Those who think the British Navy was never truly prepared for war, nor in war commanded on right principles until it was too late, base their opinions upon the following familiar considerations:

From 1905 onwards, they say, the Admiralty was dominated by a group who thought of naval war as a state of things in which Great Britain would somehow, and inevitably, command the sea. They never thought of it in terms of victorious fighting, by which alone command of the sea can be assured. Hence their preparations, their plans, and their theory of command were based upon false premises. As fighting was omitted from their calculations, they thought of ships only in terms of number, size and speed, and of weapons only in terms of range and the weight and explosive capacity of the projectiles. They did not concern themselves with finding a strategy that should force their enemy to battle, nor with tactics by which the unthought-of battle should be fought, nor with methods by which their battle weapons should be used. Not only did they not prepare to fight: they did not expect that the enemy would do so. So long as their fleet was sufficiently numerous and, according to

the narrow material standards they were able to understand, overwhelmingly powerful, they assumed that the enemy would be afraid—just as they themselves were unprepared—to attack. Accordingly they did not protect the fleet bases nor prepare for thwarting the under-water war which, had their plan been right, was the only form of war in which the enemy could engage. And, having misconceived the whole nature of war, they could not, of course, select men for the chief command on any proof of their fitness for it, nor could they train or prepare them to engage in it.

When war broke out, a member of this group, whose singular personal charm, firmness of character, grasp of detail, and talent for organization, had made him by much the most effective and influential, was sent to command the fleet which was in all essentials his own creation, and to carry out the plans of which he was so largely the author.

The Testing of a Theory.—The test of the whole work of this group naturally, and inevitably, came when the chief fighting forces of the opposed sides met at the Battle of Jutland. And those who thought this group mistaken in its aims and methods, pointed out that the commander-in-chief on that occasion was true to type. They asserted that he did not bring his fleet into action as would a man who was determined to win a decisive victory as rapidly as possible; that, on the contrary, he left the fast division of the fleet unsupported at the most critical moment; that, when circumstances enabled him to retrieve the situation, rather than allow his fleet to face the risk of a torpedo attack, he turned his ships incontinently away, and so allowed Admiral Scheer to escape. On the morrow—they went on to say—no effort was made to redeem the failure of the day before.

This, briefly, is the indictment that has been brought against the Material School and Lord Jellicoe. When, therefore, it was announced that he was about to publish a volume on his command of the Grand Fleet and the Battle of Jutland, it was natural people should expect a reasoned reply to the case that had been brought against him. *The Grand Fleet*, 1914-1916 (Cassell, 31s. 6d. net), shows that this expectation was founded on a complete misjudgment of Lord Jellicoe as a man, and consequently upon a complete misconception of his object in writing.

The Grand Fleet, 1914-1916, is not a reply to the case I have set out above, nor is it a defence of the author's policy, nor, in the narrower sense of the word, is it an apology. Take the charge that the navy was unprepared. Lord Jellicoe, so far from attempting to justify either himself or those with whom he was so closely associated both in pre-war days and after, carries the indictment to lengths that no critic of the Admiralty has ever thought of in his dreams. The policy of adopting dreadnoughts had indeed been questioned; but no one had ever suspected that every single ship of this type had been built on a hopelessly wrong constructional principle, and so built to the knowledge of those who ordered the construction. We knew that the wrong place had been chosen for the fleet base, and that it was undefended against submarines and mines. But we had no conception that no provision of any kind had been made for putting it into defence for war, and that it was without the means of fitting or supplying a single ship, or of providing the most elementary facilities for the most vital of the fleet's activities, namely, gunnery practice. The degree to which we were under-supplied with light craft as compared with the enemy was almost incredible. We had a bare quarter of their provision! We were without the means of making or thwarting under-water war generally, and in a host of crucial matters—range-finders, fire control, armor-piercing shells, searchlights, and substitutes for searchlights—we were at a disadvantage that is inconceivable. The curious thing is that as to every one, almost, of these points, controversy had been active before the war, and almost everything which experience showed to be necessary had been urged, but without success, on the boards of which Lord Jellicoe

was a member. The gallant officer's category of defects is a stupefying arraignment.

The Battle of Jutland.—When we come to Jutland, the thing is more extraordinary still. He meets the charge of unwillingness to fight at decisive ranges by explaining, with almost painful precision, why it was he feared the Grand Fleet could not survive—in sufficient strength to safeguard Allied interests—if, even for a moment, it were brought into close action with the enemy. He then goes on to show how, between 6 and 6.14, he had the choice of two modes of deployment only, and, by exquisitely careful plans, he proves to demonstration that by neither method could he either bring the fleet into action or come to the support of Sir David Beatty's squadron. Then, when at last his fleet was in action, he tells us with meticulous accuracy why at 7.23—though he knew that a German Fleet in being "was the worst possible thing for us"—he turned his ships away from the enemy the moment the first of the two great torpedo attacks was made, and then how it was just this turn, and nothing else, that enabled Scheer to break off the action and escape. And finally, with the same sustained candor, he tells us how on the morning of June 1st he expected the enemy to be at a certain place and at a certain hour, how he knew the enemy's ships had been battered and damaged, and how, nevertheless, with 25 undamaged battleships against the enemy's 20 cripples, he did not attempt to intercept them and retrieve the misfortunes of the day before.

Lord Jellicoe's Attitude.—Now, if the book is not a defence, what is it? It clearly has no parallel in literature save, perhaps, amongst the arresting records bequeathed to us by the simplicity of certain singular saints and the cynicism of a few exceptional sinners. Lord Jellicoe has, in short, set himself to the extremely difficult task of self-revelation; and he has succeeded to a very extraordinary degree. He has succeeded because he is calmly conscious that he has done his duty as he understood it, and, being perfectly confident of this, he is above consideration of fear or caution in telling the truth, the whole truth, and nothing but the truth. His is an act of faith in the sense of justice of his countrymen: the work of a man too proud to fight for a reputation which he knows to be completely unindictable on any ground of morals or of honor. He is too single-minded and too simple-minded to conceal a single motive or to misrepresent a single action. He seems to say to his readers—"I give you the story as it happened: I show you my mind at work. If I am wrong, it is because I acted on wrong principles; but I am not conscious of it. I leave my character in your keeping."

It is, then, impossible to close this book without an intense sense of the magnanimity and generosity of the writer. If there is a case against him, he has given it away quite hopelessly. It is precisely because of his conviction that there is no case that makes it so hard to insist that there is. But the obligations of intellectual integrity remain, even when it would seem that there is nothing left to fight for, and nobody to fight with, for Lord Jellicoe has disconcerted his critics by the strangely effective device of disarming himself. These obligations bind, however, because while Lord Jellicoe's book shows his motives from first to last to be of the highest, and his character to be above and beyond the least possibility of disparagement, the effect of his appeal to the public must be considered. Judging from the reviews, the book is taken to justify not only the writer—which it should—but the policy and the theory of war which he represents, which it should not. It is possible that this may be only a passing mood—the natural reaction of the confiding candor of this appeal. But whether this is so or not it seems obligatory to say that if national interests are to be served a true and not a false impression must be deduced from these pages.

The paradox of the position, of course, is that Lord Jellicoe tells the same story as his critics—with a wealth of proof to which none of them

could pretend—and, at the end of it, is still serenely confident that he did the right thing. The paradox is to be explained, it seems to me, by one thing only. He is the victim of—better, perhaps, the martyr to—the basic fallacy of the materialists' creed. He simply never realized what fighting meant and, therefore, what a fleet was for. This, I think, can be illustrated by three matters on which he dwells with some insistence.

When the battle-cruiser fleet came into sight at Jutland at six o'clock, the commander-in-chief had at once to consider how to deploy his ships. The considerations that weighed with him are set out in full on pages 343 to 351. The salient point is that he felt he could not deploy at all until he knew exactly where the German Battle Fleet was. He got his first indications of the bearing of the German Battle Fleet at 6.14 and deployed at 6.16. But *Lion* had been seen at 6 o'clock by *Marlborough*, and at 6.6 by *Iron Duke*, and she and her consorts were clearly engaged with the enemy. Should it or should it not have been elementary that here was the clue to his doubts? Could he possibly have been wrong in preparing at once to deploy in support of friends who were fighting?

Fire Control at Jutland.—The second matter is this. In the diagram describing a proposed starboard deployment, Lord Jellicoe explains that this would have involved putting on large helm, which, because his fire control was unable to get data for hits in such conditions would have put all his guns out of action. Yet when he finally got into action after changing course to south at 6.50, he ordered helm six times in the 36 minutes between 7.5 and 7.41. His experience of action certainly was then that it was impossible for an admiral to keep a fleet on a steady course for even half an hour—leave alone the consequential helm involved in station keeping after each fleet order had been given. Add to this that during this half-hour a great number of individual ships in the rear of the line had had to manœuvre freely on their own to avoid the torpedoes, over 20 in number, that passed through the line, and every turn silenced his guns! If ever a man had the practical proof of a technical requirement of fire control in action, surely it was Lord Jellicoe on May 31. Yet he takes great pains to tell us that he was perfectly content with the instruments he had, and that after the action he neither ordered substitutes for the range-finders which had failed him, nor improved instruments for finding and keeping the rate under helm!

Third, we have seen that Lord Jellicoe represents that there were but two methods of deployment open to him, and he has proved that neither could have achieved any useful purpose. But he does not enumerate amongst the lessons of his experience any revision of his tactical theory.

Yet, it is a matter of plain fact that methods of fire control, designed to meet the conditions which arose at Jutland, were submitted to the Admiralty in 1912, when Lord Jellicoe was Second Sea Lord; and a method of deployment, differing from either of those to which Lord Jellicoe considered himself limited, was worked out and practiced by the Battle Fleet in one of those rare intervals when officers not of the dominant school were in command. But writing two years after the action, Lord Jellicoe still seemed to think that he could not be blamed for having no tactical resources but those which he used or rejected, and the lessons of the battle left him without any desire for a more efficient system of gunnery.

It is strange enough that he should have forgotten that there was no reason whatever why the fleet's gunnery should ever have been paralyzed in this way, except the not too creditable reason that the Admiralty in 1912 declined to spend a trifling sum per ship to remove this inability for ever. For it was in that year proved, and in a vessel afterwards under Lord Jellicoe's command at Jutland, that a ship going full speed could fire under full helm and make a succession of hits, just as if on a steady course. The reason the wiseacres of Whitehall, while fully admitting that the instruments had done all that was claimed for them and that no other

instruments had ever even aimed at surmounting these difficulties, declined to adopt them, was that they did not think any such problem as this could arise in action!

The phenomenon with which we have to deal then is not a mind that could not foresee what war would require, nor one that could not recognize those requirements when convincingly anticipated and demonstrated. It is a something much more wonderful still, a mind unable to recognize after victory in a fleet action had been thrown away, that, had an admitted defect been met by an admitted cure, the result must have been different.

The secret of our naval failure is, then, now a secret no longer. It is explained by the mental atrophy that followed from the obsession of wrong principles and too long a retention of irresponsible because uncriticized, power. Lord Jellicoe, by a magnificent gesture and with quite simple-minded courage, impelled by some power of destiny perhaps beyond his control, has told the truth about himself and his colleagues, and has ended the dynasty for ever. *The Grand Fleet*, 1914-1916, is then not only the swan song of the Materialist School, it is its suicide. Like the blind prophet of old, Lord Jellicoe has brought down the temple and all within it. One feels inclined to add that it is his friends and not his enemies whom he has slain. But this singular man has never made an enemy.

Some of us, who recognized the things described in this book for what they were, while they were being done, and even before they were done, have wearied the public and caused incredible pain to old friends in the naval service—to whom criticism of their leaders seemed almost a blasphemy. If we attacked, it was from no personal animosity, but from sheer dread of the inevitable consequences that must follow from this devastating creed in action. Lord Jellicoe's book justifies our efforts, as surely as it ends them. Henceforth, the debate on naval policy need concern itself no longer with the persons, but with principle only.—*Land and Water*, 20/2.

JAPAN

JAPANESE STRENGTH GIVEN.—A report showing the strength of the Japanese Navy was submitted by the Secretary to fill out the reports of the comparative strength of the navies of the six other large powers which he gave recently. It shows thirteen battleships and four building or projected; seven battle cruisers, ten cruisers, sixteen light cruisers and seven more building or projected, five armored coast defence vessels, sixty-six destroyers and twenty-three building or projected, sixteen first-class torpedo-boats, eight second-class torpedo-boats, fifteen submarines and twenty-seven building and projected and two airships and sixty-three miscellaneous vessels.—*Naval Monthly*, February.

JAPAN'S MERCHANT FLEET.—According to the Japanese Department of Communications Japan had, at the end of October, a mercantile marine consisting of 2546 steamships and 11,997 sailing boats. Of the steamships, 588 were ocean-going ships above 1000 tons. The total gross tonnage of these ocean-going boats was 1,801,242, their registered tonnage being 1,135,094. Of the sailing craft, ocean-going ships above 1000 tons were only two, their gross tonnage being 3438, while their registered tonnage amounted to 2233.

Steamships above 10,000 tons numbered seven, their gross tonnage being 71,899, while their registered tonnage was 38,551. The vessels between 9000 tons and 10,000 tons numbered eight, their gross tonnage being 76,043, while their registered tonnage was 48,498. There was only one vessel above 8,000 tons, its gross tonnage being 8150. The boats between 7000 and 8000 tons numbered fourteen, their gross tonnage being 105,415. Those

between 6000 and 7000 tons were 22, their gross tonnage being 140,102. Those between 5000 and 6000 tons were 45, their gross tonnage being 256,635. Those between 4000 and 5000 tons numbered 38, their gross tonnage being 171,254.—*Nautical Gazette*, 2/15.

THE PACIFIC ISLANDS

This map shows the geographical relations of the Pacific Islands to Australasia and Japan. All the islands formerly German have been occupied, either by Australasian or Japanese forces. The Japanese hold the former German islands in the Ladrones, Marshalls, and Carolines.—*London Times*, 1/31.

UNITED STATES

REPAIR SHIP AND TRANSPORT TO BE BUILT.—Secretary Daniels has signed plans for Repair Ship No. 1 and Transport No. 2, included in the 3-year program of August 29, 1916, and directed to be begun prior to July 1, 1919.

The vessels represent a modern floating plant capable of taking care of all the ordinary repairs of the vessels of the fleet, including battleships and battle cruisers. The repair plant consists of a machine shop, brass and iron

foundry, boiler and blacksmith shop, coppersmith shop, pipe and sheet metal shop, pattern shop, and carpenter shop, electrical shop, drafting room, optical shop, and gyro-testing room. The repair ship is about 484 feet long over all with a beam of 70 feet and draft of 19 feet, displacing about 10,000 tons. The battery consists of four 5-inch guns and four 3-inch anti-aircraft guns.

The transport has been designed after a careful study of the service of the present transport, *Henderson*, during the European war. It is essentially a duplicate of the *Henderson* with such changes as were considered advisable as a result of war experience; like the *Henderson* it has been designed for the purpose of transporting an expeditionary force of marines together with their advance base outfit and equipment. The principal dimensions are: Length, 484 feet; beam, 64 feet; draft, 19 feet 6 inches; displacement, about 10,000 tons. The battery will consist of four 5-inch guns, two 1 pounder guns, two 3-inch anti-aircraft guns, and two 6-pounder guns.

Both the repair ship and the transport will be propelled by the customary steam turbines, operating through reduction gearing. The vessels have been designed for a speed of 16 knots per hour. Both vessels will be equipped with high-power radio outfits.—*Naval Monthly*, March.

NAVAL POLICY

DANIELS TO CONFER ON IDEAL WARSHIP.—Secretary Daniels and a party of American naval experts will leave for Europe next week to discuss with allied officials the best type of capital warships to be built in the future, based on the lessons gained in the great war. Because of conflicting opinions on this subject among American officers the Secretary has been asked to submit a definite recommendation to the next Congress in December.

Secretary Daniels will be accompanied by Rear Admirals Taylor, Chief of the Bureau of Construction and Repair; Griffin, Chief of the Bureau of Steam Engineering; Earle, Chief of the Bureau of Ordnance, and Commander Foote, his personal aid. The party will be joined overseas by Admiral Benson, Chief of the Bureau of Operations, who is attached to the American Peace Delegation, and Vice Admiral Sims, commanding all the American naval forces in European waters.

Mr. Daniels and his party will sail from New York on the transport *Leviathan* and will go first to Paris to confer with the French Admiralty. Later they will visit London and Rome and probably will be away a month or more.

While deductions to be drawn from war experiences on all subjects will be discussed in detail, the American Naval Mission will address itself particularly to the question of future types of capital ships. It has been the judgment of the Navy General Board, charged with fixing the military characteristics of new ships, that the United States should continue to build dreadnoughts of constantly increasing power and battle cruisers. This view is held by Rear Admiral Fletcher, chairman of the General Board and former commander of the Atlantic fleet.

Admiral Mayo, now commander of the Atlantic fleet; Vice Admiral Sims and Rear Admiral Rodman, the three officers who have held the highest posts of the American service in the war zone, believe, however, that a composite ship, combining the speed of a battle cruiser with the gun power and armor of a battleship, should be substituted. These officers have been particularly impressed by British experiments toward a composite craft with the construction of the *Hood*, one of the so-called British "hush" ships.

Secretary Daniels has not taken sides in the dispute, nor have his three chief technical advisers, the men who will design and construct whatever

ships may be decided upon, expressed any opinion on it. It is the Secretary's purpose to give these officers a full opportunity to go into all of the involved technical questions as to design during the trip abroad in order that he may have the benefit of their advice when it becomes necessary for him finally to determine future ship types.

Mr. Daniels was invited by the British Admiralty to visit Europe during the war, but he was unable to accept that invitation. Assistant Secretary Roosevelt, who will be acting Secretary while Mr. Daniels is overseas, twice visited the war zone.—*N. Y. Times*, 8/3.

NAVY DEPARTMENT—BUREAU OF CONSTRUCTION AND REPAIR

VESSELS UNDER CONSTRUCTION, UNITED STATES NAVY—DEGREE OF COMPLETION, FEBRUARY 28, 1919

Type, number and name	Contractor	Per cent of completion			
		Mar. 1, 1919		Feb. 1, 1919	
		Total	On ship	Total	On ship
Battleships					
42 Idaho	New York S. B. Co.	99.7	99.7	99.1	99.1
43 Tennessee	New York Navy Yard	61.2	58.2	60.7	54.7
44 California	Mare Island Navy Yard	55.6	42.8	53.6	40.3
45 Colorado	New York S. B. Co.	13.7	1.8	6.8	.4
46 Maryland	Newport News S. B. & D. D. Co.	41.8	32.4	39.9	31.
47 Washington	New York S. D. Co.	10.1	1.2	4.3	.4
48 West Virginia	Newport News S. B. & D. D. Co.	19.1	2.2	19.	2.1
49 South Dakota	Navy Yard, New York	0.	0.	0.	0.
50	Navy Yard, New York	0.	0.	0.	0.
51 Montana	Navy Yard, Mare Island	0.	0.	0.	0.
52 North Carolina	Navy Yard, Norfolk	0.	0.	0.	0.
Battle Cruisers					
1 Lexington	Fore River S. B. Co.	0.	0.	0.	0.
2 Constellation	Newport News S. B. & D. D. Co.	0.	0.	0.	0.
3 Saratoga	New York S. B. Co.	0.	0.	0.	0.
4 Ranger	Newport S. B. & D. D. Co.	0.	0.	0.	0.
5 Constitution	Phila. Navy Yard	0.	0.	0.	0.
6	Phila. Navy Yard	0.	0.	0.	0.
Scout Cruisers					
4	Todd D. D. & Const. Co.	24.5	1.15	24.5	1.15
5	Todd D. D. & Const. Co.	22.	1.	22.	1.
6	Todd D. D. & Const. Co.	17.6	.6	17.6	.6
7	Union Iron Works	0.	0.	0.	0.
8	Union Iron Works	0.	0.	0.	0.
9	Wm. Cramp & Sons Co.	9.	0.	9.	0.
10	Wm. Cramp & Sons Co.	9.	0.	9.	0.
11	Wm. Cramp & Sons Co.	0.	....	0.	....
12	Wm. Cramp & Sons Co.	0.	....	0.	....
13	Wm. Cramp & Sons Co.	0.	....	0.	....
Miscellaneous					
Fuel Ship No. 16 Brazos	Boston Navy Yard	89.	88.	87.5	86.5
Fuel Ship No. 17	Boston Navy Yard	17.8	.1	11	0.
Fuel Ship No. 18	Boston Navy Yard	.1	.1	0.	0
Gunboat No. 21	Asheville, Charleston Navy Yard	74.3	73.3	71.	70.
Gunboat No. 22	Asheville, Charleston Navy Yard	0.	0.	0.	0.
Hospital Ship No. 1	Phila. Navy Yard	25.	10.	24.	9.
Ammunition Ship No. 1	Puget Sound Navy Yard	72.	62.	66.	54.
Ammunition Ship No. 2	Puget Sound Navy Yard	18.	0.	12.5	0.

There are 206 destroyers, 73 submarines, 23 mine sweepers, 20 sea-going tugs, 40 harbor tugs, 12 oil tankers, and 53 Ford eagles in various stages of completion.

WILSON OPPOSED TO SINKING FLEET.—President Wilson is not in favor of taking the German Navy to sea and sinking it. The President has written a letter to Representative Alvin T. Fuller, a Republican member of Congress from Malden, Mass., expressing his disapproval of the reported intention of the Peace Conference to do so. On February 27 Representative Fuller took the matter up with the President in a letter in which Mr. Fuller asserted his belief that the business sense of the people at large "will be utterly opposed to the wanton destruction of a navy worth $200,000,000."

"Your letter of the 27th of February," says the President's reply to Mr. Fuller, "has interested and gratified me very much. I feel as you do about the project to sink the German ships. It seems to me like the counsel of those who do not know what else to do. But I have not yet had the opportunity to discuss it with any authoritative naval men and therefore do not like to form a final judgment about it without hearing them. I shall take it up when I get back to Paris and shall not forget that your judgment coincides with my own present conclusion. You are very generous in your personal message and I appreciate it most deeply. Your confidence on what I am trying to do gives me the most delightful reassurance."—*N. Y. Times*, 8/3.

ARGUE FOR SINKING OF GERMAN SHIPS.—President Wilson is taking up the subject of the destruction of the warships surrendered by Germany. Although an adverse judgment was recently attributed to him, this is the first time he has examined the matter, and he has called for data from American naval experts.

In addition to destroyers and submarines, there are involved 21 German and Austrian battleships, six battle cruisers, and 19 light cruisers. Among the arguments brought to bear for their destruction are the following:

It is in accord with Article VIII of the covenant committing the League of Nations to a general policy of disarmament. Destruction would demonstrate the sincerity of this committal.

Distribution would increase the armament of the allied European powers 30 per cent. The German naval menace having been removed, the increase would be absolutely unnecessary and illogical.

The addition of the German ships to the navy of any European power increases the economic burden and imperils the financial credit to the injury of the United States.

The distribution would further arouse competition and rivalry.

The United States should not participate in it. She went in with clean hands and should come out with empty ones, refusing to share in any spoils.

There would be danger of nations selling these ships to one another and thereby throwing naval power out of balance and causing distrust and friction.

The distribution will create new and artificial standards among the three powers dependent on sea power—Great Britain, America, and Japan. It is absolutely necessary that each should maintain its relative strength for itself and for the common interest of the League of Nations. America would have to bear the brunt of matching Great Britain in building. Thus the effect of distribution would not be to diminish but to increase the building competition and expense.

The argument that France during the war was compelled to manufacture munitions, while the other nations built warships, is academically sound, but France suffered no real comparative disadvantages. Germany's naval destruction removes her sea danger, and the ostensible expansion would only add to France's expense in the face of decreased financial resources.

The distribution of capital ships with the United States not participating, would work out as follows: Before the distribution Great Britain

has 43 capital ships, and all the others 42. The proportion of destroyers and submarines runs about the same. The United States must build 26 more capital ships than Great Britain in order to be on a basis of equality.

Distribution on the basis of two ships to one would give Great Britain 53 capital ships and all the others 59, and the United States would have to build 36 more to reach an equality with Great Britain.

If the distribution were made on the basis of losses suffered in the war Great Britain would have 63 and all the others 49, and America must build 46 more than the British. The distribution would compel the nations to support 112 instead of 85 capital ships.

If both America and Great Britain should refuse the German ships the distribution would be as follows: France, with seven capital ships before the distribution, would have 11 under the first method of distribution and 12 under the second; Japan, with 13 before the distribution, would have 17 by the first method and 13 by the third method of distribution; and Italy's share would be five, nine and seven respectively. Japan would thus have the same total of capital ships as America.

Summing up, the arguments are as follows:

1. In the face of the covenant committal to decreased armament, distribution makes an immediate increase of 30 per cent in allied European armaments.

2. As matters stand the American ability to put through a building program creates the possibility of inducing Great Britain to join her in the alternative of scaling down to the lowest point the number of ships consistent with self-protection and maintaining the League, whereas distribution will make new standards to be built up to.

3. Distribution will vastly and unnecessarily increase the burden of taxation.

4. World interests would be subserved by no one power controlling the seas against all comers.

5. The morale of the world requires a dramatic heralding of better days. Distribution is a step in the opposite direction.

6. Destruction preserves entire our moral position with respect to Germany.

7. American interests compel the acceptance of a joint naval burden with Great Britain. Distribution will make that burden too great for America to carry.

8. Finally if the German fleet is thrown among the Allies to be contended for as a prize. it will prove a veritable apple of discord that may make its surrender profit to Germany more than if she had risked her ships in a final battle. The division of naval spoils would be a negation of the principle of co-operation which is the foundation stone of the League.—*N. Y. Times*, 15/3.

SUPER BATTLE CRUISER IDEA FOR NEW NAVY.—Franklin D. Roosevelt, Acting Secretary of the Navy, was asked in Washington the other day if he would make a statement in language that every one could understand about the controversy now raging (with no ill-feeling, however, among our chief naval officers) as to what should be the dominant type of ship in our new program for a navy equal to any in the world.

What he said showed that the issue had been gathering for a year, though it did not culminate in any step known to the public until Secretary Daniels recently announced that, pending a decision as to the future type, work on the six new battle cruisers would be discontinued, and that he, accompanied by his three chief technical advisers, would visit the Navy Departments of England, France, and Italy and study at first hand the naval lessons of the war.

From reports sent out of Washington the inference would be that the main purpose of the visit to Europe was to adapt or be guided by the latest naval activities over there. The case appears somewhat different. If the idea on which the division now exists is adopted by our navy, we would lead the way for the world in a type of ship as destructive in its character as the first dreadnought. In the words of Secretary Roosevelt, who weighs the pros and cons in the light of naval experience in the war, it would be "a tremendous departure."

Up to this time the line of development in our navy, and in all navies, more or less, has been to push forward two distinct types of heavy ships, the cruiser and the battleship. Each has been made more and more formidable in its special characteristics. Here, on the next step, is where the division of opinion takes place in our navy. This is the contention of one body of the experts:

Fuse the two types into a ship as nearly as possible to the power of the dreadnought and to the speed of the battle cruiser—itself, to be sure, as its name implies, a British experiment in the same direction. Vice Admiral William S. Sims. who commanded our naval forces in Europe during the war; Admiral Henry T. Mayo, commander-in-chief of the United States Atlantic fleet, and Admiral William S. Benson, Chief of Operations, are reported to be advocates of this type.

The contention of the other body of naval experts is:

Continue to develop the cruiser and the battleship types separately. Increase the speed and effectiveness of the battle cruiser in its special lines and push the weight of armor and the gun power of the dreadnought to the furthest practical point. Among the officers who take this position are several admirals of the department of the General Board.

"The first thing to consider," said Mr. Roosevelt, "is types of ships. It is a physical impossibility to concentrate in one ship the three principal objects aimed at by naval designers. These are speed, protection, and offensive power, in other words, guns. If the design of the ship is to attain extraordinarily high speed, then it is necessary to sacrifice either protection or guns or both. If, on the other hand, the aim is for a ship with the heaviest possible armor and armament, then speed must be sacrificed.

"A great many people have the idea that all that is necessary is an order from Congress that the ship to be built must carry the heaviest guns and the heaviest armor and have the highest possible speed, say 35 knots an hour. But with the present development of hulls and engines, it is absolutely impossible to build a 35-knot ship without reducing weight of guns and armor in some way. On the other side of the problem, the heavier the guns and the armor the more boiler and machinery space have to be cut down, and thereby one of the three chief objects in naval construction, as I indicated—speed—is lost.

"The question therefore resolves itself into one of naval opinion as to the most desirable of the several types of ships, and the decision depends on which side, in the final summing up, the weight of that opinion takes, as to the strategic and tactical uses for heavy ships. It may be said that three schools of thought on this subject exist at this time, and these are built around three types of large ships, as follows:

"First, the almost impregnable battleship which at the same time carries the heaviest known armament, a development, it might be said, of the latest dreadnought in our navy. Such a ship would carry twelve 16-inch guns in the main battery and thoroughly distributed armor of from 12 to 14 inches in thickness, but the best speed that could be obtained for a vessel of this type would probably be not more than 23 knots on a displacement of 35,000 tons.

"Second, the so-called fast battleship, a development of the British H. M. S. *Hood*. A vessel of this type could have a speed of from 29 to 30 knots, but could probably mount only eight 16-inch guns in her battery,

and thickness and distribution of armor would necessarily be materially weakened.

"Third, the battle cruiser type, a vessel similar to those already planned by our Navy Department, and on which a small amount of work has been done, though none of the six keels has been laid. These vessels are designed for a speed of 35 knots and an armament of eight 16-inch guns. Their armor belt, should the program be carried out as originally made, would be not more than six inches in thickness. A vessel of this type would serve, of course, a purpose very different from that of the heavy battleship, or even of the fast battleship. The battle cruiser cannot be expected to hold the fighting line against the more powerful ships. The advocates of the type maintain that it has distinct uses. It is true that other powers have battle cruisers in their navies to which the United States has no answer—battle cruisers which, though not so fast and powerful as the ones projected by us, are nevertheless too fast for us to bring to action with our battleships and too powerful for us to overcome with our fastest destroyers. It is asserted that the battle cruiser can better than any other type of ship dominate the merchant vessels of an enemy, and it is pointed out that battle cruisers formed a fast squadron of the British fleet during the war and took a principal part in two of the naval engagements—that of the Falkland Islands and that of the Dogger Bank.

"In both of these actions the battle cruisers were opposed to old armored cruisers, as at Falkland, or to battle cruisers of the German fleet, as at Dogger Bank. In the battle of Jutland, Admiral Beatty's squadron of battle cruisers began the action with the German battleships and maintained it until after the arrival of the British battle fleet. There is no doubt that the battle cruisers are a distinct asset to any battle fleet, but if the question is not whether they shall be built in addition to dreadnoughts, but whether they shall be built instead of dreadnoughts, there is room for argument.

"With regard to the battleship type itself choice must be made between the fast battleship of 29 or 30 knots and the slower vessel of 23 knots. Speed, is, of course, so desirable that many officers believe that it is more worth while to have six or seven extra knots; that this speed compensates for certain offensive and defensive characteristics. For instance, the fast battleship of present size can have no hull as much subdivided as the slower vessel. She would be more easy to sink if struck by torpedoes; on the other hand, she would be harder to hit with torpedoes because of her speed. So, too, the armor would give less protection against shell fire, but her speed would give more opportunity to choose her own position against the slower enemy battleships.

"I have tried to illustrate in non-technical language some of the pros and cons of the question which is so prominently before the Navy Department at this particular time. I think it is safe to say that the Navy Departments of England, France, Italy, and Japan, in fact, every Navy Department of any importance, is each faced with the same problem, and that among their officers, as well as ours, differences of opinion exist. The character of the naval side of the war has been such that it has not clearly demonstrated which theory is the correct one.

"Only three actions during the war saw the use of dreadnoughts or battle cruisers. In one of them, the Falkland Islands fight, the battle cruiser was matched against an older and in every way weaker type, the armored cruiser. At the Dogger Bank a decisive result was prevented by the headlong flight of the German battle cruisers into port. At the battle of Jutland Beatty's battle cruisers performed magnificent work against a much heavier force of German battleships, but the later phases of the battle were hampered as to affording any unmistakable lesson by fog and the approach of night. Discussion of the battle of Jutland is going on in all the naval circles at the present time, and it may be said that we are just beginning to take stock of the performances of the different types of ships

in the war. It is for this reason that the Secretary of the Navy has decided that work on our six authorized battle cruisers shall not be resumed until the situation has been surveyed thoroughly and the three chiefs of the navy technical bureaus, Ordnance, Construction, and Repair and Steam Engineering, will spend some time in Europe to go into the problem fully.

"In common with England and France, the United States ceased practically all work on capital ships during the war, because it was obvious that the existing fleets were entirely able to take care of the German capital ships if they had to come out to fight instead of surrendering. Work on the ten dreadnoughts now building for our navy is, of course, going on, and a decision on the battle cruisers will be reached this spring."

"Have the designs of the officers in the navy who advocate a new fast battleship type advanced for enough to make it clear that this proposition is a feasible one?" was asked.

"I will answer that by saying," answered the Acting Secretary of the Navy, "that it is considered possible to build a 30-knot battleship that would carry as many guns and as heavy armor and other protection as the 23-knot battleship, but such a ship would be in every way a bold experiment. It would have to be nearly twice the tonnage and of much greater horsepower—probably 200,000—than the present battleship, length probably above 800 feet, and the main armament twelve 16-inch guns, with an armor from 12 to 14 inches thick. The cost, it is estimated, would go to $40,000,000 instead of $20,000,000. The question then arises whether in our new navy program it is wise to put all our eggs in one basket, for it is obvious that the country would probably not build as many of these ships as of the smaller size costing half as much."

"What effect would the adoption of this new type of ship have on the ships we now have?"

"It would make them obsolete so far as the new ships were concerned, but not as against the existing ships of other navies," was the answer. "So far as I know at present, the British, the French and the other navies are not developing the intermediate type of high-speed battleship, but are maintaining, and continuing, the construction of the separate types of the high-speed battle cruiser and the heavy-powered battleship. If the United States develops the new type of fast battleship in any numbers it will be a tremendous departure, and the sole question is whether it would be better policy to try to put all the advantages in a 30-knot boat.

"I hope I have made the questions at issue clear so the public can understand. Personally I believe in absolute publicity on questions of this kind; in other words, that no attempt be made by the Navy Department to hide one of the most interesting problems that has come up for a long time, but I believe the stand of the public and of Congress should be just what my stand is as a civilian—even though I have been in very intimate touch with naval affairs for six years—and that stand is that judgment as expressed by civilians or by Congress should not control, but that the final opinion of the best-qualified naval officers should be accepted by the country. That opinion should, and will, represent the careful study by naval officers who stand the highest in construction, in ordnance, in engineering, in theoretical strategy and tactics and in actual experience under sea-going conditions.—*N. Y. Times*, 16/3.

MATÉRIEL

APPROPRIATIONS FOR THE NAVY.—Senator Weeks on March 4 obtained leave to put in the *Congressional Record* the army and navy appropriations which have been made by Congress since the year 1900, including the appropriations which were prepared and on the Senate calendar, "to show the increase in the proposed appropriations above those of preceding

years at a time when we are supposed to be entering into a period of universal peace."

The table referred to is as follows:

1900	$ 48,099,969.58
1901	65,140,916.67
1902	78,101,791.00
1903	78,856,363.13
1904	81,876,791.43
1905	97,505,140.94
1906	100,336,679.94
1907	102,091,670.27
1908	98,958,507.50
1909	122,663,885.47
1910	136,935,199.05
1911	131,350,854.38
1912	126,478,338.24
1913	123,225,007.76
1914	140,800,643.53
1915	144,868,716.61
1916	149,661,864.88
1917	313,300,555.84
1918	517,273,802.08
1919	1,238,282,968.56

1918. The estimates of the Navy Department for 1918 amounted to $379,151,701.67, the Senate appropriated $535,637,802.08, and the law for that year carried a total appropriation of $517,273,802.08.

1919. In the estimates of the Secretary of the Navy for 1919, which were sent to the Congress on October 15, 1918, when the United States was still at war, the department asked for appropriations amounting to $2,644,307,046.05. Since the signing of the armistice the Secretary has revised his former estimates, and is now asking an appropriation of $975,903,621.28, which includes $200,000,000 for the construction of battleships, etc., being the first appropriation in a proposed three-year shipbuilding program, costing $600,000,000.—*Army and Navy Register*, 8/3.

PERSONNEL

NAVAL PERSONNEL EMBARRASSMENT.—The naval authorities are in something of a predicament in regard to certain features of the naval personnel because of the failure of Congress to enact the naval appropriation bill. That situation leaves the Navy Department without the authorization of a definite number of enlisted men to which it is possible to demobilize. The bill as it passed the House provided for 225,000 men, which may or may not have included apprentices, etc.; the Senate increased this total strength to 250,000 men, as the bill was reported from the Senate Naval Committee. The opinion of the naval authorities is that Congress will eventually provide for not more than 225,000 men, including apprentices, hospital corps, and so on and, in anticipation of such authorization, it is probable that the demobilization will be so conducted as to reduce the enlisted strength to 225,000 by the 1st of July. As an aid to this project, there will be prepared in the Navy Department tables showing the number of reserve officers, line and staff, arranged according to branches, the number ashore and afloat, respectively, the number of other than commissioned reserves ashore and afloat, and the number of men in the regular navy other than commissioned officers. These tables will exhibit the situation existing on the first of each month up to and including the beginning of the new fiscal year. The Marine Corps, not having obtained its permanent enlisted strength of one-fifth of the navy, or 26,000 men, will probably not be increased permanently if a League of Nations is formed. As to the perma-

nent naval enlisted force, it is estimated that it will amount to 137,000 plus hospital corps men.—*Army and Navy Register*, 8/3.

NAVAL RESERVE PROMOTIONS.—Orders have been issued by the Secretary of the Navy directing the board that met on December 31 last to select line officers of the regular navy for promotion, to reconvene after return of the fleet from the West Indies, to select line officers of the naval reserve force for promotion. Under the schedule of operations movements now in force the fleet probably will not return to home waters until about the middle of April. The board will be instructed to recommend such number of naval reserve officers above the rank of lieutenant as are found pre-eminently qualified for the duties of higher rank in accordance with the act of July 1, 1918. All officers that do not meet in full the standard of the regular service in their respective grades, as modified by requirements for their respective classes in the naval reserve force, will be eliminated from consideration. Promotion of naval reserve officers has been deferred pending efforts to secure legislation that would permit the convening of a special selection board for them. A provision relating to the matter was contained in the naval appropriation bill, which did not pass before adjournment of Congress. Therefore it is necessary to reconvene the last board for the regular navy. This board is made up of Admiral Henry T. Mayo, Vice Admiral Albert Gleaves and Rear Admirals Frank F. Fletcher, Albert G. Winterhalter, Thomas S. Rodgers, Hugh Rodman, Thomas Snowden, John A. Hoogewerff and Edwin A. Anderson, with Commander Harold G. Bowen as recorder. Although no orders yet have been issued to that effect, it is expected that boards also will be convened to select staff officers of the naval reserve force for promotion.—*Army and Navy Register*, 8/3.

NAVY BOARD OF AWARD NAMED TO PASS ON HONOR MEDALS.—*Consists of Eight Retired Officers with Rear Admiral Austin McKnight as President.*—The Navy Department issues the following:

Secretary Daniels to-day appointed a board of award for considering the cases of all officers recommended to receive medals of honor, distinguished-service medals, and naval crosses, as provided for in an act of Congress, approved February 4, 1919.

The board consists of retired officers of prominence whose opinions and decisions could not fail to give satisfaction to the service at large.

The board consists of the following officers:

Rear Admiral Austin M. Knight, U. S. Navy, president.
Rear Admiral Mordecai T. Endicott, C. E. C., U. S. Navy, retired.
Rear Admiral Charles J. Badger, U. S. Navy, retired.
Rear Admiral De Witt Coffman, U. S. Navy, retired.
Capt. Joseph H. Linnard, C. C., U. S. Navy, retired.
Capt. John C. Boyd, M. C., U. S. Navy, retired.
Col. Paul St. Clair Murphy, U. S. Marine Corps, retired.
Capt. Mitchell C. McDonald, P. C., U. S. Navy, retired.

During the early part of the year letters were written to all officers who exercised the function of command, both ashore and afloat, to send in recommendation in the cases of officers under their command whom they deemed worthy of receiving medals. These cases will be considered by the board.—*U. S. Official Bulletin*, 8/3.

OPERATIONS

SIX GERMAN SUBMARINES SOON TO BE BROUGHT TO U. S. PORTS.—*U-Boats Recently Delivered in British Harbors Will Be Exhibited to Public.*—Secretary Daniels authorizes the following:

Arrangements have been completed to bring to United States ports six of the German submarines recently delivered in British harbors. These

vessels, selected as representing the different types of the German submarines, will be brought over for exhibition to the public and for study by our engineers, constructors, and submarine officers of the scientific aspects of the machinery, much of which is understood to be very highly developed.

The status of these vessels is in no wise changed and their ultimate disposition remains subject to the decision reached by the peace conference just like that of the others of the German fleet.—*U. S. Official Bulletin*, 1/3.

LARGE GERMAN SHIPS TAKEN OVER.—America's share of German ships in home waters and which will be turned over to the United States for operation as troop transports comprises a formidable list of 12 German merchantmen, and includes some of the largest vessels afloat. In the group is the gigantic *Imperator* of nearly 52,000 tons, and with a troop capacity of 10,000 men. The list of vessels assigned to the United States, with the gross tonnage and troop capacity of each, follows: the *Graf Waldersee*, gross tonnage, 13,193; troop capacity, 1500; *Pretoria*, 13,234, 1300; *Patricia*, 14,466, 2200; *Cleveland*, 16,960, 3500; *Kaiserin Augusta Victoria*, 24,581, 3800; *Cap. Polonia*, 19,500, 2500; *Cap. Finistene*, 14,503, 2000; *Imperator*, 51,969, 10,000; *Zeppelin*, 15,200, 2700; *Prinz Frederich Wilhelm*, 17,082, 3500; *Burchard*, ——, 3300; and the *Columbus*, 35,000, 8000. The work of repairing and converting these vessels will be done by the navy and they will be operated by the navy for the army account. The first ships will probably arrive in the United States about April 1 and will be assigned to the third naval district for conversion; and if practicable all the vessels will be converted in that district. The plan of division among the Allies provided that the United States would be allotted the large, fast steamers, suitable for transatlantic service. Some of these vessels are practically ready for sea; particularly is this true of the huge *Imperator*, which is reported in excellent condition except for some boiler tubes.—*Army and Navy Register*, 8/3.

WORK OF THE CRUISER FORCE.—The Navy Department has received a report from the commander of the cruiser force, showing that during the month of February 96,368 passengers were landed in United States ports by the cruiser and transport force. Of this number 10,565 were carried by seven cruisers and 7850 by seven battleships. The rated capacity of the vessels arriving was 104,211. The total of invalids carried was 16,356.—*U. S. Official Bulletin*, 8/3.

MERCHANT MARINE

NEW MARKINGS FOR UNIFORMS OF MERCHANT MARINE APPRENTICES.—In order that young Americans entering the Merchant Marine through the United States Shipping Board's training service may be distinguished by their dress from navy men, the Board has adopted distinctive markings for the uniforms of apprentices aboard its ten training ships, on which 3000 men a month are now being drilled for service in merchant crews.

Although of standard seaman's blue and of traditional cut, the merchant marine apprentice's uniform differs particularly from that of the navy man in its new markings. Two broad stripes are worn on the collar and cuffs of the blouse instead of three narrow ones, as in the navy, while instead of white they are "old" blue, the same shade as that on the blouses of British and French merchant sailors. Another distinguishing mark is the insignia of the Shipping Board, an anchor supporting the national shield, worked in silk in red, white and blue on the blouse pocket.

The new uniform, which has just been issued at the Shipping Board's training stations at Boston, Norfolk, New Orleans, San Francisco and

Seattle respectively, was first seen in public on President Wilson's arrival at Boston, February 24, when 1000 merchant marine apprentices, representing all the states east of the Rockies, marched in the President's escort, behind their own band.

The merchant marine apprentices are provided with their uniforms by the Shipping Board and are permitted to wear them after they leave the training ships, at the end of two months' schooling, to take their places in regular merchant crews. Until this country entered the war, uniforms were not worn among American merchant sailors, except by men employed on the deck of passenger liners. The Shipping Board has found that young Americans, now entering the merchant service, have more regard for themselves and their job when in uniform, and that the merchant sailor commands greater respect when ashore, either in home or foreign ports if in uniform.—*Shipping*, 8/3.

TAGGING THE MARINER.—Thumb prints and photographs are parts of a system of identification through which Uncle Sam follows the fortunes of the sailors who are manning the country's new merchant marine.

The merchant mariner is officially weighed, measured, pictured, and thumb-marked before he goes aboard ship, and then is officially tagged as well, his picture and thumb-mark, and the facts pertaining to him being affixed to a small four-page folder, printed on stout paper.

This paper is a vital document. Without it the sailor cannot ship for a voyage. Should he lose it he loses his right to go ashore in a foreign port. Officially he ceases to exist when he parts with it.

It is, in short, a passport, although it is known as a "citizen seaman's identification card." Among sailors it is termed Form K. for short, the paper being so marked in the upper left corner.

Even when actual peace comes, the sailor cannot roam at will in the ports of the seven seas. He is of too much value to his country to be lost from sight in the big economic job of trade expansion. In sailing-ship days, half a century ago, when the sailor went to sea he merely signed for a voyage. With his sailor dress as his credentials, he made himself at home in every port in every land. But he is no longer an irresponsible rover. The American boys who are now entering the merchant marine through the open door of the Shipping Board's Recruiting Service, are prepared to be examined, thumped, pounded, measured, photographed and thumb-printed.—*N. Y. Times*, 16/3.

NAVIGATION AND RADIO

FIRE DESTROYS NAVY RADIO.—*Six Hundred Foot Tower at South San Francisco Complete Loss.*—The Navy Department is informed that the 600-foot radio tower at South San Francisco was destroyed by fire yesterday morning. The fire was discovered shortly before 6 o'clock in the morning about 200 feet from the base. As it was impossible to reach the flames and extinguish the fire, the tower was completely destroyed, falling at 11 a. m.

The report states that the station is out of commission pending the re-establishment of the tower and the antenna, but that temporary arrangements for handling the transpacific traffic and other messages have been made.

An investigation is now being made.—*Official Bulletin*, 14/2.

LINK WIRE AND WIRELESS.—*Discovery in Telephone Operation Reported to Electrical Engineers.*—Wireless and wire telephone systems can be linked so that the human voice will perform one lap of a journey over a wire and the next lap through the air to its final destination, while the replying voice will travel on air waves first and then on wire, according to a paper presented by E. B. Craft and S. H. Colpitts, of the Western

Electric Company, at the convention yesterday of the American Institute of Electrical Engineers, at the Engineering Societies Building, at 29 West Thirty-ninth Street.

The operation of transferring the sound from the wire to the air can be accomplished, the paper said, by a device not more complex than the repeater now used in long-distance telephoning. The two engineers held that wireless telephoning would be a supplement to, and not a rival of, wire systems. The lack of secrecy and the impossibility of keeping thousands of air messages distinct in wireless telephoning in a city, it was said, prevented competition. The future of the wireless, it was said, seemed to lie in communication with ships, trains in motion, islands, and inaccessible places of all kinds and in the broadcasting of weather signals and other news.

ENGINEERING

THE LOOMIS COOLING SYSTEM FOR AIRCRAFT.—*A System Embodying a Nose Radiator, an Adjustable Booster and a New Form of Expansion Tank with Positive Ejection.*—Two features new to airplane cooling systems and which are adaptable to any airplane carrying a water-cooled engine have been developed at McCook Field, Dayton, Ohio, and incorporated in the *USD-9A* day bombing machine. Particulars of these features, comprising what is known as the Loomis cooling system, appeared in a War Department publication of recent date, which is herewith abstracted by special permission.

The Loomis cooling system for aircraft was developed at McCook Field, Dayton, Ohio, and first applied to the *USD-9A* plane. Particulars of this system have been given in a recent issue of the Bulletin[1] of the Experimental Department, Airplane Engineering Division, Bureau of Aircraft Production, War Department, from which the following information has been abstracted by special permission.

The two new features in the Loomis system are an expansion tank that surrounds the core and is an integral part of the nose radiator, thus taking the place of the shell ordinarily used; and an injector in the water connection between the main and booster radiators, which draws water through a nozzle outlet from the bottom of the expansion tank and injects it into the return pipe, thus keeping constant the volume of water in the circulating system.

It is claimed that through these features the loss of water due to steaming or air pockets is minimized and excessive depression in the pump intake is prevented, making possible a much faster water circulation and, therefore, increased cooling efficiency without danger of cavitation in the pump or the drawing in of air around the hose connections on the suction side.

Water from the cylinder jackets enters the upper well of the nose-radiator core in the usual manner, and nearly all of it works down through the core to the bottom of the well, and then through the venturi outlet to the return pipe leading to the booster radiator and the pump. Owing to the action of the venturi, the head of water in the nose-radiator core and the type of pump impeller used, pressure is built up on the intake side of the pump.

A small quantity of water from the upper header of the radiator core normally overflows through holes in the top of the upper well into the expansion tank (Fig. 1) above, and then flows downward in this chamber by gravity. The lowest part of the expansion tank, underneath the lower header of the radiator core, has an outlet nozzle which opens into the

[1] Bulletin of the Experimental Department, Airplane Engineering Division, U. S. A., McCook Field, Dayton, Ohio, Vol. 2, No. 2, November, 1918, pp. 61-68.

throat of, and is concentric with, the venturi outlet from the lower tank. The top of the expansion tank is open to the atmosphere through the vent pipe terminating in the radiator filler neck, so that constant atmospheric pressure is maintained on the water in the expansion chamber, in order that it may be drawn into the return pipe through the action of the venturi at the nozzle.

The auxiliary radiator is located in the water return line between the nose unit and the pump, so that all water from the main radiator passes successively through the venturi and the booster or auxiliary radiator, from top to bottom, before reaching the pump. Fig. 2 shows the connection between the main radiator, injector and booster.

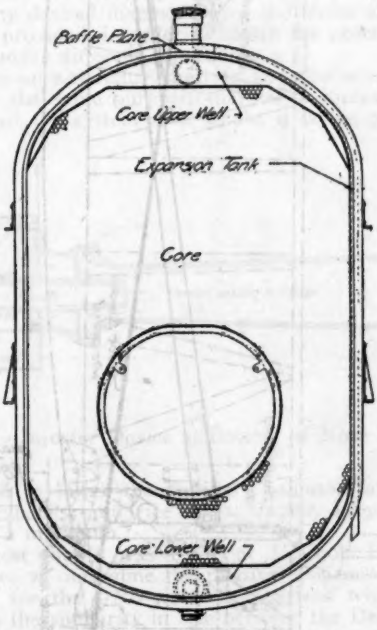


FIG. 1.—Diagram Showing the Expansion Tank Around Radiator Core as Used on the *USD-9A* Plane.

Running entirely around the outside of the nose-radiator core and its upper and lower headers is a separate compartment, ⅞-inch wide, and of the same depth as the core, which acts as an expansion chamber for the cooling system. The only communications between this tank and the upper well of the radiator core are three $\frac{5}{16}$-inch vent holes. As shown in Fig. 3, the bottom of the well of the core communicates only indirectly with the bottom of the expansion tank through the venturi and nozzle. The injector consists of a $1\frac{1}{16}$-inch diameter venturi outlet from the lower tank or well of the radiator core, with the ½-inch diameter nozzle of the outlet pipe from the bottom of the expansion tank projecting into the throat. The general construction of the outlet is shown in Fig. 3.

Mounted in a vertical rack to the rear of the engine and transversely to the fuselage is the adjustable booster radiator, which is connected in series with the nose unit. The auxiliary radiator may be lowered to project

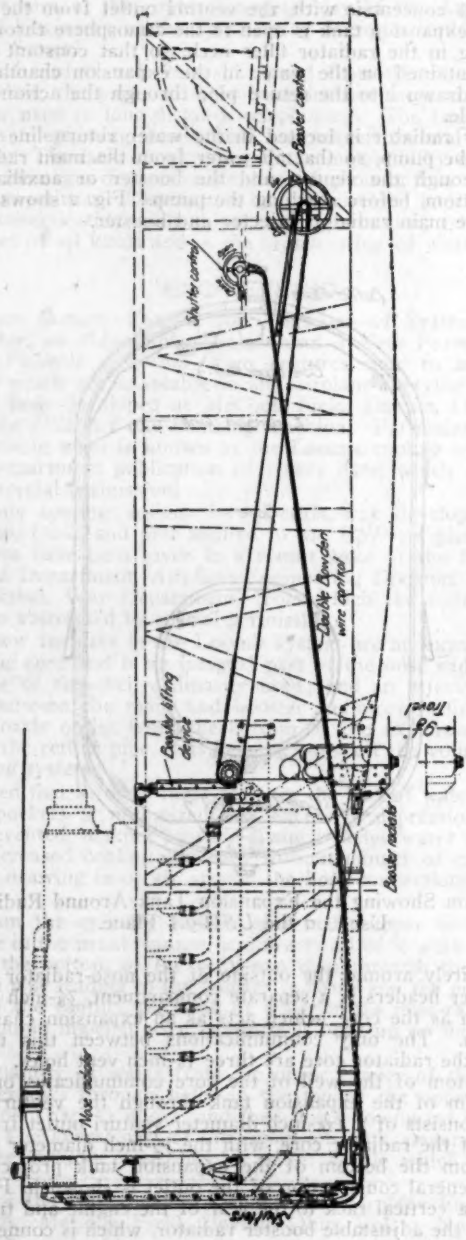


FIG. 2.—*USD-9A* Cooling System.

9⅛ inches below the bottom cowl of the fuselage, or drawn up into the body until only the edge of the lower tank is exposed.

When the auxiliary unit is lowered to its extreme position, practically its entire surface is exposed to the air stream under the fuselage.

In its upper position this radiator has very little cooling effect, as it is then almost entirely enclosed in the fuselage and only a small amount of air can circulate through it. Most of the air going through the nose radiator is discharged through the louvers in the engine cowls forward of the booster.

The auxiliary cooling unit is raised or lowered by a handwheel on the right side of the pilot's cockpit, which is connected by short lengths of chain and intervening wires with a pinion meshing with a rack attached to the upper part of the auxiliary radiator. The pilot can set the booster unit to project any desired distance below the under side of the fuselage, within the limits provided, in order to obtain the exact amount of cooling capacity needed under different conditions.

While both the nose-radiator shutters and the adjustable-booster unit are provided for the same purpose, that is, to increase or decrease the cooling capacity of the system as a whole, it is the practice to open the

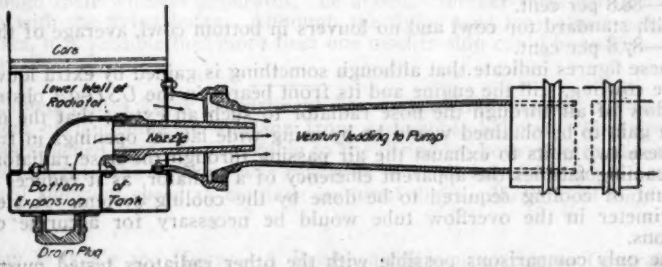


FIG. 3.—Injector Device at Bottom of Nose Radiator.

shutters first and to lower the auxiliary radiator later, to provide still greater cooling capacity, and vice versa, thereby keeping the parasite resistance down to a minimum.

A series of test flights was made at McCook Field with two DeHavilland-4 planes to determine the relative efficiency of the new cooling system designed for the *USD-9A* in comparison with other comparable types. Owing to the similarity in size between the DeHavilland-4 and the *USD-9A*, and to the fact that both planes carry standard Liberty-12 engines, it was considered that the tests would give a good indication of the performance to be expected of the new system in the *USD-9A*.

The other radiators tested on the same planes for comparison were the Wolverhampton, used in the British DeHavilland-4, and rated as adequate for a 350-h. p. engine, a special American Monogram radiator made by the A-Z Co., and two sample Mayo radiators with ribbon-type cores. These last two were especially designed for the American DeHavilland-4 with Liberty engine. The units tested were near enough alike in general features to offer a fair basis of comparison for the *USD-9A* system.

By means of preliminary tests a type of pump impeller was selected which was found to be well suited to the new system which produces a certain amount of pressure on the intake side of the pump due to the action of the injector. For use with the Wolverhampton radiator, it was necessary in order to prevent excessive suction to cut down the standard straight-blade impeller with the DeHavilland-4 to 3¼-inch diameter. The regular pump impeller was used without alteration with the other radia-

tors tested. The original report gives the curves of pressure on pump inlet both developed by the straight-bladed pump impeller cut down to 3¼-inch diameter for the English radiator and by the *USD-9A* radiator with curved-blade impeller used with the Loomis system.

Various precautions described in the original report were taken to insure the correctness and comparability of results obtained with various radiators.

One of the interesting features developed in the tests is that the greatest difference between air temperature and water outlet temperature was found at altitudes between 3000 and 5000 feet, which tends to prove the assertion that a radiator which is adequate up to 3000 feet under rapid-climb conditions will probably provide sufficient cooling capacity for all purposes.

The following conclusions are made in the report, which also gives the main data secured in tabular form.

Taken on the whole, the *USD-9A* radiator tests yielded quite good figures for efficiency, which can be depended upon as reliable. The efficiency values obtained in the various trials of this system were:

With no engine top cowl, bottom cowl with extra louvers—91 per cent.

With extra louvers in top and bottom engine cowls, average of two tests—88.8 per cent.

With standard top cowl and no louvers in bottom cowl, average of three tests—87.8 per cent.

These figures indicate that although something is gained by extra louvers in the cowling, still the engine and its front bearer in the *USD-9A* obstruct the flow of air through the nose radiator to such an extent that the only great gain to be obtained would be by using wide lateral openings in front of these two units to exhaust the air passing through the nose radiator.

Steaming falsifies the apparent efficiency of a radiator, as it reduces the amount of cooling required to be done by the cooling system. A steam calorimeter in the overflow tube would be necessary for accurate corrections.

The only comparisons possible with the other radiators tested must be based on the figures obtained during those trials where no steaming of the other units took place. The comparative results obtained in such tests, with corresponding figures for the *USD-9A* system, are given in Table 1.

TABLE 1. COMPARATIVE EFFICIENCY OF RADIATORS

Radiator	Efficiency, per cent	Cooling surface, square feet	Weight full, pound
Monogram	76.75	202	176.5
Wolverhampton	82.5	246	142
USD-9A	91	219	204.5

The addition of engine top cowling must produce less effect on the new cooling system than on the other two radiators mentioned in Table 1, for the reason that part of the total cooling surface of the new system, represented by the booster radiator, is independent of all cowling above or below the engine, provided, of course, the lower cowling does not obstruct the auxiliary unit when in its lowest position. The addition of shutters on the nose radiator also produces less effect on the *USD-9A* cooling system than on the others, and for the same reason.

With this radiation system any reasonable increase in cooling capacity can be obtained by adding to the height of the auxiliary radiator. It is quite probable, however, that the present amount of auxiliary radiation is sufficient in view of the fact that very little steaming was encountered even under the severe conditions of the tests. Under ordinary conditions the high-compression Liberty engine is not intended to be run at full throttle near the ground, as was done in these tests.—*Mechanical Engineering*, 19/3.

AERONAUTICS

OCEAN FLIGHT WITHIN MONTH.—*England, Says Admiral Taylor, May Try Dirigible Next Week.*—Rear Admiral D. W. Taylor, Chief of the Naval Bureau of Construction and Repairs, announced that the navy would be ready to attempt the flight by heavier than air craft across the Atlantic Ocean within a month.

"I do not believe that Great Britain will beat us across," he said, "if the attempt is made with heavier-than-air craft.

"We are under the impression in Washington, however," he continued, "that a dirigible trip will be undertaken by England possibly during the coming week. The navy has four flying boats of the *N. C.-1* type, and work on these is almost completed. It has not yet been decided whether all four will be sent over at the same time, but I believe that more than one will start. That will insure against total failure should one or two break down."

Admiral Taylor said that he was not certain whether a non-stop trip would be attempted. "We may break into two hops," he said, "and this will entail the use of airplane mother-ships, vessels equipped with oil, gasoline and food."

"Through their wireless apparatus," he added, "mother-ships can keep in touch with the flying boats. Although the flying boat may alight only once at sea, it is possible that more than one mother-ship could be used."—*Baltimore Sun*, 18/3.

The United States Navy Department has successfully carried out the experiment of launching an airplane from a dirigible balloon. The airplane was attached by a 100-foot cable to the dirigible; both rose to about 3000 feet and then the airplane was released; after diving about 1000 feet it obtained sufficient speed to continue its usual flight.—*Mechanical Engineering*, 19/3.

AIRSHIP WAS UP 100 HOURS.—A British airship, according to General Seeley, recently remained in the air for more than 100 hours. At an average speed of 50 miles an hour, the Under Secretary added, the airship must have covered more than 5000 miles. It was possible that the airship could have continued longer in the air, notwithstanding the fact that it encountered considerable wind.—*N. Y. Times*, 22/2.

MAKES AIR-FLIGHT RECORD.—*Lieutenant Harmon Negotiates Washington-New York Route in 85 Minutes.*—The Director of Military Aeronautics issues the following:

Lieutenant Frank H. Harmon, pilot of Bolling field, Anacostia, February 19, established a record flight from Washington to New York by airplane in a La Pere plane.

He landed at Hazelhurst, N. Y., 85 minutes after his "take off" at Bolling field.—*U. S. Bulletin*, 27/2.

GIANT SEA PLANES MAKE NEW RECORD.—Two giant United States naval flying boats of the *F-5-L* type broke all records in a 300-mile non-stop flight from Hampton Roads to New York City yesterday. The flight was made against a strong head wind in four hours and a half. Each of the two great flying machines carried seven passengers and a gross load of 13,000 pounds.

During the flight the *A-1070*, one of the two flying boats, developed trouble in one of her 400-horsepower Liberty motors. While the huge machine continued on in the teeth of the stiff breeze Chief Mechanic Sacks overhauled the defective engine and succeeded in repairing the fault in mid-air. After this the flight proceeded without further incident.

The two big flying boats—the *A-1070* and the *A-4036*—rose from the choppy waters of Hampton Roads exactly at 10 o'clock, March 12. They tied up to the buoys of the naval air station at Rockaway just as the naval guard struck five bells at 2.30 o'clock March 12.

The flight was made for special reconnaissance work as well as to establish a record. It also gave to the navy officials valuable data in connection with the plans for the coming attempt to cross the Atlantic in a flying boat two and one-half times the size of the *F-5-L's*.

Each of the two boats carried a great quantity of photographic apparatus, and valuable photographs and moving pictures were taken during the flight. These are to be shown at the Aeronautical Exposition to-day by the photographic section of the United States Navy.

The *A-1070* was piloted by Ensign Souther. As passengers she carried Lieutenant W. L. Richardson, chief of naval aviation photography; Ensigns Marbury and Morrow, Chief Mechanicians Sacks and Driceland and Radio Operator Bowman.

The *A-4036* was piloted by Ensign Irvine, and her passengers were Ensigns Pulliam and Sinclair, Photographer Kramer, Mechanicians Nice and Bark and Wireless Operator Miller.

Wireless telegraph and telephone communication was maintained between the two ships and with the shore stations throughout the flight. Two homing pigeons, used by the navy, were also carried.—*Baltimore Evening Sun*, 13/3.

BIGGER AIRPLANE FOR OVERSEAS FLIGHT NOW BEING RUSHED AT NAVY'S FACTORY.—A type of naval airplane, which in point of size, power, and carrying capacity exceeds the *N. C.-1*, is now under construction at the Navy's League Island aircraft factory in Philadelphia, it became known yesterday when an aircraft designer, who had been at the factory, described its features in detail.

The designer, who would not consent to have his name made public, said that work on the plane was going on night and day in order to have it ready as soon as possible for the contemplated transatlantic flight. Officials of the navy's air service, he said, had great faith in the new flying boat, and believed it would accomplish a trip to Europe with little or no difficulty.

The design of the new super-airplane, which is known as *Model T*, is similar to the navy's *F-5*, now being shown at the Aeronautical Exposition in Madison Square Garden and the 69th Regiment Armory. It has an upper wing span of 250 feet, which is 124 feet more than the *N. C.-1*. The lower wing is 25 feet less. The length of the craft over all is 80 feet. The wings are 12 feet broad and 14 feet apart.

The motive power for the new naval airplane will be supplied by five Liberty motors of 400 horsepower each. Three will be tractors and two pushers.

Seventy-five passengers will be able to ride comfortably in the *Model T*, according to *The Times* informant, making ample allowance for tanks carrying sufficient gasoline and oil for a flight of 2000 miles. The *N. C.-1*, has carried 51 passengers on one of its trips. If the new *Model T* lives up to the hopes of its builders, it will establish a new passenger-carrying record.

Construction on the machine has progressed so rapidly that its completion is expected in the very near future, according to the aircraft designer who told of its details. He was unable to express himself more definitely as to the date of its completion, he said, because of the many unforeseen difficulties which arise in building airplanes of a new type.—*N. Y. Times*, 2/3.

HELIUM.—"When the armistice was signed one of the experimental plants which had been operated at Fort Worth, Texas, had successfully

produced helium at the rate of 3000 or 4000 cubic feet per day, but as this production was far below what would be required for the needs of the War Department and the Navy Department, to say nothing of that of our Allies, it was determined to undertake production on a large scale, and for this purpose contracts were entered into by the Navy Department, acting for both the War and Navy Departments, for the construction of a plant at Fort Worth having a capacity ten or twelve times as great as the experimental plant from which helium had been produced.

"The necessary machinery for equipping this plant is now nearing completion, and the buildings will soon be under construction.

"In order that the supply of this rare gas may be conserved contracts have been entered into with the owners of the wells supplying it, by which the use of this gas for domestic purposes will be limited to such an extent as to conserve it for a period varying from 10 to 20 years. The necessity of doing this will be evident from the fact that foreign governments have already shown the greatest interest in this gas and are making every effort to secure a supply of it. The importance of conserving it is so great, however, that officers of the War and Navy Departments believe that Congress should lose no time in enacting legislation which will secure to the government the sole control of all helium-bearing gas in this country.

"In explanation of the great military value of the gas it is stated that one shot from an explosive bullet is sufficient to explode the hydrogen-filled balloon of any airship, while the same balloon filled with helium is absolutely safe from attack.

This was thoroughly demonstrated by the Navy Department before the signing of the armistice by conducting experiments at Anacostia on balloons filled with hydrogen and others filled with helium, which, at the time, was disguised under the name of argon. One shot into the hydrogen balloons was sufficient to explode them, while a number of shots into the argon-filled ones produced no effect other than a scorching of the envelope at the point of entrance of the bullet."—*Secretary Daniels' Nat'l Press Club Speech, 25/2.*

THE DOUBTFUL FACTORS IN THE PROBLEM OF TRANSATLANTIC FLIGHT.—That a flight across the Atlantic Ocean will be made in the immediate future is almost certain. It is, in fact, altogether remarkable that isolated feats of this kind have not been achieved before now. The establishment of anything like a regular aerial transport service over the Atlantic is, however, quite another matter. It would be unsafe to predict how soon, and under what conditions, this will be realized.

The monumental report of the Civil Aerial Transport Committee, recently published in England, embodies some discordant ideas on this interesting question. Few persons give more study to the problem of transatlantic flight than Commander Porte, whose preparations to undertake such a journey in the summer of 1914 were terminated by the outbreak of the war. This authority, as quoted in the report just mentioned, believes that the direct route between Ireland and Newfoundland is at present out of the question, and that for many years to come the only practicable route will be by way of the Azores. Commander Porte also considers Newfoundland an unfavorable terminus for the westward journey, on account of the obstacle opposed to a safe landing by the notorious fogs of that region. He prefers a landing ground on Long Island, though its distance from San Miguel (Azores) is about 2250 nautical miles, as compared with 1346 miles from San Miguel to Newfoundland.

The elements of uncertainty in transatlantic flying are almost wholly meteorological. The proposed Azores route offers the advantage of the trade winds for the westward journey. Whether, and to what extent, the counter-trades, which blow above the trades and in the opposite direction, could be utilized for the return journey to Europe is still doubtful, because we lack precise information about these winds; particularly as to the level

at which they blow. In higher latitudes westerly winds prevail, but they are much interrupted by cyclonic storms. Here, again, the question arises whether it would be possible to fly high enough to secure comparative immunity from adverse currents.

That the coasts of Newfoundland are habitually shrouded in fog seems to be taken for granted in all speculations about Atlantic flight. The British report, however, contains two communications from authoritative sources which emphatically discredit this idea. Sir E. Morris, who has lived and yachted along the Newfoundland coast for years, declares that fog prevails there only with winds from a quarter between northeast and southwest, while the prevailing winds are from west and northwest. He has seen a whole season from April to November pass without rain or fog. He also emphasizes the fact, borne out by a letter from another resident of Newfoundland, that the fogs of that region are generally very shallow. This, we recall, was likewise the experience of the U. S. Coast Guard observers.

The moral of all this seems to be that a meteorological and aerological survey of the North Atlantic Ocean and the adjacent coasts should be undertaken as soon as possible, with special reference to the needs of aeronautics. That air lanes across the Atlantic are destined to become of great economic importance hardly admits of doubt. The study of surface meteorological conditions over the ocean, the corner-stone of which was laid by Maury in the middle of the last century, has yielded results of indispensable value to mariners. Maury depended for his data upon the mariners themselves; but the Maurys of the air should better this plan and *anticipate* the demands of aerial navigators, by a systematic campaign of scientific expeditions *ad hoc*. This method would obviate heavy losses in both life and money in the early stages of trans-ocean flight.—*Scientific American*, 3/1.

AERIAL MAIL IN THE UNITED STATES AND ABROAD.—By Otto Praeger, Second Assistant Postmaster General.—The Aerial Mail Service was inaugurated May 15, 1918, and during the first six months of its existence its operations covered 68,892 miles, at a cost of $75,165.94, including 6 per cent on investment and 33⅓ per cent for depreciation. In that period it carried between Washington and New York 7452½ pounds of aeroplane mail. The revenue derived was $60,653.28. The net deficit, not taking into account the 6 per cent interest on investment, was $8,969.08. In addition to the aeroplane mail carried there was dispatched between Washington, Philadelphia, and New York in the six months' period a total of 91,926½ pounds of first-class mail, aggregating 3,667,040 letters. This mail was advanced in dispatch from 6 to 12 hours, which many times made up for the small deficit in the operation of this service. This ordinary mail was letter mail from distant states, which was carried in addition to the aeroplane mail. Thus the ordinary mail put on the planes at Washington was usually mail from the South Atlantic Coast states and the Gulf states, distributed to carriers by the Railway Mail Service before reaching Washington, and by reason of aeroplane dispatch was delivered in New York on the same afternoon instead of the following morning.

The Washington-New York route was established not as a typical commercial line, but to solve the problems that had to be met to establish a daily dependable schedule. The flying record made on the New York-Washington line has never been equaled in the history of aviation, and its operation by civilian flyers of the Post Office Department has far exceeded its operation while under military control, the civilian fliers having a record of but seven forced landings in 100 consecutive flights and only two failures in that time on account of fog or storm conditions. The mail has been carried in blinding rain and hail, on fog-bound days with visibility of not over half a mile, and in the face of gales. Only two winter gales were strong enough to prevent the aeroplanes from com-

pleting their journey. On Thursday, January 23, the mail was brought south as far as Silverside, Del., in the face of a 65-mile gale at an altitude of a few thousand feet.

The fastest time of flight carrying the mail from College Park to Belmont Park, N. Y., a distance of 218 miles, was 1 hour and 30 minutes, and the slowest time for a continuous flight was 4 hours and 56 minutes. The average time is 2 hours and 40 minutes. The common experience of the users of aeroplane mail is that a letter posted in the down-town stations in Washington as late as 10.50 a. m., and leaving the aviation field at 11.30 a. m., is usually delivered between 4 and 4.30 in the afternoon, which is in ample time before close of business.

Extension of Service.—The greater distance between the points on an aerial mail route the greater is the service rendered to commerce and the greater is the patronage of the line. A mail service leaving New York at 6 in the morning and arriving at Chicago before 3 o'clock in the afternoon, in time to connect with carrier deliveries, will advance the mail between the two cities by 16 hours over any train dispatch that can be made after the departure of the Twentieth Century Limited from New York at 2.45 p. m. The department desires to establish this line immediately and extend it west to the foot of the Rockies during the coming fiscal year, with the view of reaching the seaports of Seattle and San Francisco, if Congress authorizes the appropriation necessary. The air mail time between New York and San Francisco will be less than 40 hours. It is desired that this transcontinental trunk line shall be tapped by lines from Minneapolis, St. Paul, St. Louis, Kansas City and other points, and ultimately by a line from Boston, via Albany, Buffalo and Detroit, to Chicago.

A north and south trunk line from Boston to Atlanta should likewise be established, with an ultimate extension from Boston to Montreal, Canada, and from Atlanta, via Key West, to Habana. Based on the accurate cost accounting kept in the operation of the Washington-New York air mail line, the cost of an east and west trunk line from New York as far west as Omaha and a north and south trunk line from Boston to Atlanta has been carefully estimated at $1,600,000. To this should be added $400,000 for several essential feeders that would connect up Detroit, Minneapolis and St. Paul, St. Louis, Kansas City and other points, and would admit of an extension as far west as Salt Lake City, this extension, however, dependent upon the extent to which the government equipment can be transformed into strong and safe mail-carrying machines.

For this reason it would be very desirable to obtain an appropriation of $2,000,000 for the ensuing fiscal year.—*Flying*, March, 1919.

THE SIGHTING PROBLEMS OF THE AVIATOR.—One of the greatest difficulties experienced by aerial fighters, when machine guns on airplanes came into general use, was to hit the target aimed at. This may seem, to the uninitiated, like a bald statement of poor marksmanship, but in reality it is not. As a matter of fact, to bring down an enemy machine without specially designed sights is nothing more nor less than pure, unadulterated luck.

For instance, imagine two machines passing each other along parallel lines, 100 yards apart, each traveling 100 miles per hour. You are equipped with a machine gun firing 700 shots a minute—11 each second—the bullet traveling at the rate of 4,960 feet per second. If you took a dead aim at the enemy machine your first bullet would miss its mark by 18 feet, and the second bullet, coming 1-11 of a second behind the first one, would miss its mark by 45 feet.

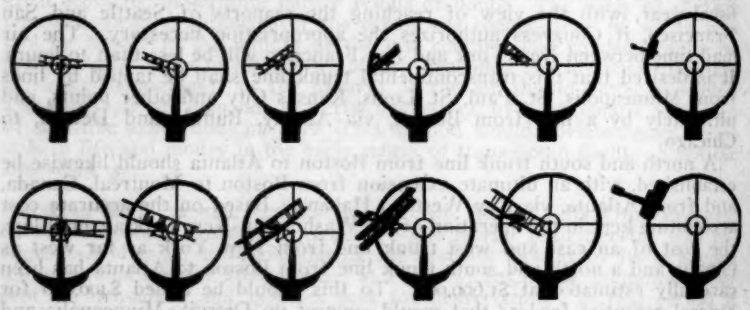
To offset this, and to make aerial fighting more of a science, ring sights were devised. These sights consist of two rings, a small one, representing the bull's eye, and a larger one encircling it, representing the line of flight of the bullet. If aim is taken when the enemy machine is crossing the outer

circle (the hostile aircraft being 100 yards distant and traveling at the rate of 100 miles per hour) the bullet would reach it as it enters the smaller ring, constituting a direct hit.

But this only compensates for the speed of the enemy machine. You still have to make allowance for the speed of your own machine. This is done by means of the Norman Compensating Foresight, a bead sight fitted to a swivel, with a wind-vane swinging on one side, which raises and lowers the bead, and revolves on its axis, according to the pressure of the wind in the slip-stream.

The most wonderful of all sights, however, is the Aldis Optical Sight, used for stationary guns when firing through the blades of the propeller. This sight was invented by the two Aldis Brothers, manufacturers of lenses, who, under subsidies from the British Government, have brought the making of high grade lenses to a higher point than the German's finest workmanship.

The Aldis sight is virtually a telescope which neither magnifies nor diminishes, and which, unlike an ordinary telescope, can be used with the eye several inches from the end of the tube.



SILHOUETTES ILLUSTRATING THE USE OF THE RING BACK-SIGHT WITH THE WIND-VANE FORE-SIGHT.

(The former is set for the estimated speed of the adversary, while the latter automatically compensates for the speed of the plane on which it is mounted. The upper row of silhouettes is for a range of 200 yards; the lower row shows the same objects at 100 yards.)

When looking through this tube at a distant object the effect is exactly as though one were looking through a napkin ring—the object appears the same whether it is seen through the tube or outside it—but, apparently suspended in the air, is a ring sight. The peculiarity is that the ring is seen with its center on the spot at which the tube is pointing, no matter where the eye is placed. If the eye is moved sideways the ring appears to move with it through the telescope, so that the direction in which the tube points is always toward the center of the ring.

The tube, when fixed rigidly to a gun, thus constitutes a sight which offers practically no obstruction to the view, and which shows instantly the spot at which the gun is pointing, without the necessity of alining the eye on a front and back sight. The effect produced on the pilot of seeing an enemy machine flying into this ring suspended in mid-air is quite startling.

One advantage of this sight is that it can be used with both eyes open. One eye sees the object and the circle through the tube, the other eye

sees the object direct. The effect, after a little practice, is that the object is seen as clearly as though there were no sight at all.

The tube is about three feet long and about three inches in diameter, and contains five specially constructed and arranged lenses.

One fact about aerial fighting, however, which has never been mentioned is that, after the first sight has been obtained, the pilot never uses his sight at all. He watches the bullets—literally! That is, he watches the tracer ammunition. One in every three shots is a tracer—a bullet which trails a little path of smoke; and it is much more interesting to watch the tracers than it is to keep the eye on the sights. Most pilots would like to use *all* tracers if they could, for they kill as readily as the regular bullets. But, unfortunately, tracer ammunition is dirty, and will soon choke the bore of the gun. As it is, a great many pilots load their magazines and belts with every other one a tracer, though it is strictly against the rules. The temptation though is too great to be resisted.

The tracer is made the same as the ordinary bullet, except that, in the end, is a small quantity of magnesium which ignites. It is not quite accurate, as it is lighter and drops a little in its flight, but it serves its purpose wonderfully.—*Scientific American*, 15/2.

MISCELLANEOUS

300,000 IN A. E. F. BY JULY 1, IS PLAN.—*General Pershing Announces Eighteen Divisions to be Returned by that Time.*—Announcement by General Pershing's chief of staff that eighteen National Guard and National Army divisions were scheduled to sail from France before July 1 apparently confirms reports which have been current here that the expeditionary forces were to be reduced to a total strength of 300,000 by the end of the current fiscal year.

Calculations in the various War Department bureaus, it is said, have been based upon the 300,000 strength in figuring on the maintenance of the army abroad after July 1.

The announcement from France indicates that in addition to the seven regular divisions now in France and into which presumably men desiring to remain temporarily are being transferred, the American forces after July will include the 78th and 81st National Army divisions and one other division. This would give a nine-division strength for the combatant forces and allow one division for employment as a depot unit.

While the statement from Paris named only eighteen divisions, all others now in France except the seven regular and four National Guard and National Army divisions already are on priority for early return, and have been skeletonized and are returning as casuals.

German shipping, which now becomes available, will be used in the repatriation of the troops. The order of precedence of their return is based on the order of their arrival. The only exceptions to this ruling will be when the availability of rail and sea transportation, the relative location to ports of the controlling military situation makes the exception necessary.

Troops in the service of supply and labor troops will be returned in the order in which their services can be spared, and as far as possible in the order of their arrival in France.—*N. Y. Times.*

72,951 DEATHS IN OVERSEAS FORCES AND 34,493 AMONG TROOPS AT HOME.—The following statistics showing the number of deaths during the war in the American Expeditionary Forces and among troops in the United States have been prepared by Statistics Branch, General Staff, War Department.

Figures for the United States are from April 1, 1917, to February 14, 1919; for the American Expeditionary Forces, to February 16, 1919.

Source of information: Current statistics section and medical records section, Division of Sanitation, Medical Department.

	American expeditionary forces	United States	Total
Disease	20,829	32,737	53,566
Battle	48,768	.....	48,768
Other	3,354	1,756	5,110
Total	72,951	34,493	107,444

—*U. S. Bulletin, 25/2.*

The destroyer *Ingram,* said to be the first vessel in the United States Navy named for a non-commissioned member of the service, was launched at the Fore River plant of the Bethlehem Shipbuilding Corporation at Quincy, Mass., late last week. It was named after Osman Kelly Ingram, chief gunner's mate of the destroyer *Cassin,* who was killed when that vessel was torpedoed by a German submarine. The *Ingram* was christened by the sailor's mother, Mrs. M. E. Ingram, of Park City, Ala.—*Shipping,* 8/3.

CONSCIENTIOUS OBJECTORS REFUND $8,589 ARMY PAY.—The War Department authorizes publication of the following statement:

The War Department has received from conscientious objectors as refunds of pay the sum of $4,319.82. Conscientious objectors have also refunded their pay through the channel of the Y. M. C. A. to the amount of $270. The Friends' Society had received up to February 15, $4,000 designated for Friends' reconstruction work from conscientious objectors unwilling to accept pay from the army. This makes a total of $8,589.82 thus refunded.—*U. S. Bulletin,* 28/2.

PROGRESS IN FINDING JOBS FOR RETURNED SOLDIERS AND SAILORS.—More than 75 per cent of the returning soldiers and sailors who need assistance in finding employment are being placed in jobs through the United States Employment Service, the Department of Labor announces.

The employment service is finding that of the average 60,000 men weekly discharged from the army, 30 per cent, or 18,000, must find new work, and that 20 per cent of the total, or 12,000, each week are being placed in employment through the Federal Employment Service and its co-operating welfare, civic, and other organizations. The placement figures are based only upon the reports of men known to have been placed, and it is estimated that at least 5 per cent more are being helped to jobs through the employment service. There is a much higher percentage of men needing new jobs among the soldiers from the industrial centers than from the agricultural districts.

The employment service is conducting its soldiers' placing work through offices and agents in all demobilization camps and 2000 special bureaus for returning soldiers, sailors, and war workers in the towns and cities. The bureau for returning soldiers and sailors of the United States Employment Service in the District of Columbia, for instance, has thus far received 2113 applications from soldiers for jobs, and of this number has placed all but 50.—*U. S. Bulletin,* 28/2.

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SCIENTIFIC AMERICAN. **March 15.**—The North Sea Mine Barrage (I), by *Capt. Reginald R. Belknap, U. S. N.* Future of British Flying, by *C. H. Claudy.* Reflecting Prisms—Their Use in Place of Mirrors, by *Naval Instructor T. V. Baker, R. N.*

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DIPLOMATIC NOTES

From February 20 to March 20

PREPARED BY

Allan Westcott, Associate Professor, U. S. Naval Academy

PROGRESS OF PEACE CONFERENCE

Inclusion of League Covenant in Peace Preliminaries.—At the time of President Wilson's return to Paris on March 14, the Special Commissions on Responsibility for the War, Reparation, Waterways, Boundaries, etc., had progressed with their investigations to a point where many of their conclusions could be presented for final action. M. Pichon, French Foreign Minister, on March 16 stated that German delegates would not be called to Versailles until a complete understanding had been reached among the allied and associated powers. Then the German delegates must either accept the terms and sign, or a state of war would continue.

M. Pichon regarded it as very doubtful if the complete covenant of the League of Nations could be included in the preliminaries of peace, which should be signed at the earliest possible moment. He pointed out that considerable time would be required to hear the views of neutrals, which had been invited, and to dispose of amendments. The issue, he suggested, might be met by a declaration in the treaty of the principles underlying the League, leaving the details in abeyance. American delegates, however, were proceeding on the assumption that the full covenant would be included in the preliminary treaty, and on March 17 it was announced that the Supreme Council had so decided, the covenant to be attached probably as an appendix.

The invitations to neutrals to express their views on the League of Nations was sent out March 14, setting March 20 as the date for the conference on the subject.

Work of the Boundaries Commission.—On March 12 it was agreed by the Supreme Council that the decisions regarding the Turkish, West German, and Adriatic boundaries (between Albania and Jugoslavia) should be made by the Supreme Council rather than the Special Boundaries Commission. The report of the Commission on Polish Boundaries, presented March 17, accords to Poland a "corridor" to the Baltic, including the port of Danzig, with the privilege to Germany of free communication across this strip to East Prussia.

Waterways Commission Decisions.—On March 15 the Commission on the International Régime of Ports, Waterways, and Railways continued

its consideration of clauses to be inserted in the peace treaty in regard to the navigation of the Rhine. It was the recommendation of the commission that the Rhine should be opened to all nations without discrimination, under control of a commission similar to that established for the Danube.

The status of the Kiel Canal, according to a report of March 12, was settled by the commission on the basis of freedom of use for all nations for merchant vessels and warships in time of peace, the canal to continue under German ownership and operation. The question of the fortification of the canal was left to military and naval experts. The commission declared the Panama and Suez Canals outside their sphere of action, on the ground that these were not *international waterways*, each being within one country. The commission in general confined its work to European problems.

GERMANY GRANTED FOOD SUPPLIES.—On March 14 an agreement was signed at Brussels by which Germany was assured immediate delivery of 270,000 tons of food stuffs and the right to purchase 370,000 tons of food per month from enemy and neutral countries until the next harvest, in return for which German shipping as agreed upon would be turned over to the Allies for transport of troops to America and food to Europe.

Negotiations on this subject at Spa in the first weeks of March had failed, owing to the unwillingness of the Allies to make definite promises of food for more than a limited period and the objections of France to any method of payment which might reduce Germany's ability to meet her war obligations.

The first shipment of food under the present arrangement is to be paid for by a deposit of £11,000,000 in gold at Brussels. Future supplies are to be paid for by the export of certain products, such as potash, needed by the Allies.

German ships in Chili, including 36 steamers and 52 sailing vessels, aggregating 241,186 net tons, have been allocated to the United States to use until the peace treaty is signed, when title to them will be determined. About 300,000 tons of German shipping now in German ports have also been turned over to the United States.

ITALY RELEASES SUPPLIES TO SLAVS.—It was announced from Paris on March 7 that at the request of the Supreme Council, Italy had consented to reopen transportation across the Italian-Austrian frontier, closed by Italy since the middle of February. The blockade prevented the movement of food, some 80,000 tons of which had been accumulated by Mr. Hoover at Fiume and Trieste, to supply the Southern Slavs and Czechoslovaks. According to a Washington statement of March 6, the American Government had previously warned Italy that in the event of further delays in the movement of relief supplies to the Slav states, steps would be taken to cut off the flow of American foodstuffs to Italy.

The blockade was due to friction between the Italian forces of occupation and the Slavs, especially at the railroad center of Laibach, out of which an Italian mission was forced on February 19. Food supplies from the

United States to Italy are said to amount to $60,000,000 monthly, while the relief of the Czechs, Jugoslavs, and Serbians costs almost $20,000,000 monthly.

PROPOSED MILITARY AND NAVAL TERMS

At the session of the War Council on March 10 Marshal Foch was generally triumphant in having his conditions accepted. Some important changes were made, however, one of which imposes severer conditions than even Foch proposed.

It was premier Lloyd George who offered this. He asked that the German Army strength should be fixed at 140,000 men. As a result of discussion, it was agreed to fix the army strength at 100,000, or less than half the original maximum recommended under the terms laid down by the Allies.

Germany must raise this force by voluntary enlistment. In order to prevent an army of this size being trained every year, it was provided that the enlistments should be for a period of twelve years. The number of German officers is fixed at 4000, instead of the 6000 as originally contemplated.

All artillery and other equipment in excess of the requirements of the reduced army must be surrendered, and the Imperial General Staff must be abolished.

Other military provisions require the destruction of the Rhine forts and the reduction of the munitions output to the needs of the reduced army.

The naval terms, among other provisions, require the personnel of the German Navy to be restricted to 15,000 men.—*N. Y. Times*, 11/3.

ARGUMENTS AGAINST SINKING GERMAN BATTLESHIPS.—Prior to President Wilson's return to France, a letter said to have been written by him was published in which he expressed tentative disapproval of the proposal to sink the surrendered German battleships. After his return to Paris, however, he again took up the question. The arguments in favor of sinking the ships are summarized as follows by C. H. Grasty (*N. Y. Times*), March 17:

1. In the face of the covenant committal to decreased armament, distribution makes an immediate increase of 30 per cent in allied armaments.
2. As matters stand the American ability to put through a building program creates the possibility of inducing Great Britain to join her in the alternative of scaling down to the lowest point the number of ships consistent with self-protection and maintaining the League, whereas distribution will make new standards to be built up to.
3. Distribution will vastly and unnecesarily increase the burden of taxation.
4. World interests would be subserved by no one power controlling the seas against all comers.
5. The morale of the world requires a dramatic heralding of better days. Distribution is a step in the opposite direction.
6. Destruction preserves entire our moral position with respect to Germany.
7. American interests compel the acceptance of a joint naval burden with Great Britain. Distribution will make that burden too great for America to carry.
8. Finally if the German fleet is thrown among the Allies to be contended for as a prize, it will prove a veritable apple of discord that may make its surrender profit to Germany more than if she had risked her ships in a final battle. The division of naval spoils would be a negation of the principle of co-operation which is the foundation stone of the League.

CABLE CLAIMS DISPUTED.—Early in the war the British cut the two German cables from Emden to America by way of the Azores and also the cable between Monrovia, the Liberian capital, and Brazil. They took one end of the German-American cables to Halifax, thereby securing another transatlantic line for themselves. The other cable they gave to the French Government, which so far has made no attempt to utilize it, probably because of the scarcity of submarine cable material and of cable-laying ships.

The British now contend that these cables are prizes of war. They do not intend to allow their return to Germany or to regard them as subject to disposition by the Peace Conference. The American delegates, however, contend that the cables were unlawfully cut and unlawfully reconnected, because the United States was not at war when this was done and had an interest in them as being one of the termini. Nor, they contend, was there proper warrant for the cutting of the cable between Liberia and Brazil, as both these countries were neutral at the time it was done.

There never has been any decision regarding the title to cables outside of territorial waters in time of war, and the Americans are now extremely anxious that no precedent shall be established that might place American business at the mercy of foreigners or prevent free communication between the United States and Central Europe after the conclusion of peace.

In addition to the transatlantic cables, several German cables in the Pacific also were seized by the British as prizes of war. One of these runs from the island of Yap, one of the Caroline group, to Singapore, connecting with the Dutch and British cables. Another connects this cable with the island of Celebes. Possession of these lines, it is held, insures business control of a fair proportion of Australian Polynesia, which is regarded as properly within the field of American commercial effort.

The possibility of these cables passing in some degree under the control of Japan alone in case the latter is made the mandatary of the captured Pacific Islands is also regarded with disfavor by the American representatives unless some plan to prevent any possible discrimination is made.—*N. Y. Times*, 13/3.

SMALL STATES SEEK AMERICAN CONTROL.—The project of making the United States mandatary for one or more of the small states to be established in the Near East has been frequently broached at the Peace Conference. The proposed Armenian state, for which American control has been especially suggested, will probably have a population of about 6,000,000, in a territory bordering the Black Sea for 400 miles and extending southward nearly across Asia Minor. Mr. Oscar Straus, former Minister to Turkey, said in reference to this proposal:

> The United States must never take a mandate for any of these new or small states in Europe or Asia Minor. It would involve us in endless trouble.

PREMIER CLEMENCEAU WOUNDED BY ANARCHIST.—On February 19, Premier Clemenceau was hit by three of seven shots fired by an assassin. One bullet entered the right shoulder and lodged under the left shoulder missing the spinal cord and lungs; the other two caused little more than abrasions of the skin. The attack occurred at 8.55 a. m. just after the Premier had entered his automobile to drive from his home to the Foreign

Office. The assassin, an anarchist, 18 years old, named Emile Cottin, was arrested and on March 14 sentenced to death.

The aged Premier made an astonishingly rapid recovery, taking up his public duties again in scarcely more than a week.

LEAGUE OF NATIONS DISCUSSION IN THE UNITED STATES

PRESIDENT WILSON'S BOSTON SPEECH.—Landing in Boston upon his return from France, President Wilson on February 24 spoke vigorously in that city in advocacy of the project for a League of Nations. "In the name of the people of the United States," he declared, "I have uttered as the objects of this great war ideals, and nothing but ideals, and the war has been won by that inspiration." Arguing the necessity of a League of Nations, he said:

If America were at this juncture to fail the world, what would come of it? I do not mean any disrespect to any other great people when I say that America is the hope of the world; and if she does not justify that hope, the results are unthinkable. Men will be thrown back upon the bitterness of disappointment not only, but the bitterness of despair. All nations will be set up as hostile camps again; the men at the Peace Conference will go home with their heads upon their breasts, knowing that they have failed—for they were bidden not to come home from there until they did something more than sign a treaty of peace.

Suppose we sign the treaty of peace and that it is the most satisfactory treaty of peace that the confusing elements of the modern world will afford, and go home and think about our labors, we will know that we have left written upon the historic table at Versailles, upon which Vergennes and Benjamin Franklin wrote their names, nothing but a modern scrap of paper; no nations united to defend it, no great forces combined to make it good, no assurance given to the downtrodden and fearful people of the world that they shall be safe.

Any man who thinks that America will take part in giving the world any such rebuff and disappointment as that does not know America. I invite him to test the sentiments of the nation. We set this up to make men free, and we did not confine our conception and purpose to America, and now we will make men free. If we did not do that, the fame of America would be gone, and all her powers would be dissipated. She then would have to keep her power for those narrow, selfish, provincial purposes which seem so dear to some minds that have no sweep beyond the nearest horizon.

I should welcome no sweeter challenge than that. I have fighting blood in me, and it is sometimes a delight to let it have scope, but if it is a challenge on this occasion it will be an indulgence. Think of the picture, think of the utter blackness that would fall on the world. America has failed! America made a little essay at generosity, and then withdrew. America said, "We are your friends," but it was only for to-day, not for to-morrow. America said, "Here is our power to vindicate right," and then the next day said, "Let right take care of itself, and we will take care of ourselves." America said, "We set up a light to lead men along the paths of liberty, but we have lowered it; it is intended only to light our own path." We set up a great ideal of liberty, and then we said: "Liberty is a thing that you must win for yourself. Do not call upon us."

And think of the world that we would leave. Do you realize how many new nations are going to be set up in the presence of old and powerful nations in Europe, and left there, if left by us, without a disinterested friend?

Do you believe in the Polish cause, as I do? Are you going to set up Poland, immature, inexperienced, as yet unorganized, and leave her with a circle of armies around her? Do you believe in the aspiration of the Czechoslovaks and the Jugoslavs, as I do? Do you know how many powers would be quick to pounce upon them if there were not the guarantees of the world behind their liberty?

Have you thought of the sufferings of Armenia? You poured out your money to help succor the Armenians after they suffered; now set your strength so that they shall never suffer again.

The arrangements of the present peace cannot stand a generation unless they are guaranteed by the united forces of the civilized world. And, if we do not guarantee them, can you not see the picture? Your hearts have instructed you where the burden of this war fell. It did not fall upon the national treasuries, it did not fall upon the instruments of administration, it did not fall upon the resources of the nation. It fell upon the victims' homes everywhere—where women were toiling in the hope that their men would come back.

When I think of the homes upon which dull despair would settle were this great hope disappointed, I should wish for my part never to have had America play any part whatever in this attempt to emancipate the world. But I talk as if there were any question. I have no more doubt of the verdict of America in this matter than I have doubt of the blood that is in me.

And so, my fellow-citizens, I have come back to report progress, and I do not believe that the progress is going to stop short of the goal. The nations of the world have set their heads now to do a great thing and they are not going to slacken their purpose. And when I speak of the nations of the world I do not speak of the governments of the world. I speak of the peoples who constitute the nations of the world. They are in the saddle and they are going to see to it that, if their present governments do not do their will, some other governments shall. And the secret is out and the present governments know it.

SENATORIAL OPPOSITION TO LEAGUE PLAN.—Just at the close of Congress, on March 4, 37 Republican senators signed a round robin declaring opposition to the League of Nations covenant as prepared by the Paris Committee. This opposition was based on various grounds—such as fear of conflict with the Monroe Doctrine; fear lest we should be forced against our will into disputes in all parts of the world; weakening of our sovereignty in matters of strictly national concern, such as the size of armaments, exclusion of foreigners, etc.; and a feeling expressed by many that, while a League was desirable, it should not be incorporated in the peace treaty or accepted in its present form. While hostility to the League plan was expressed by at least two Democratic senators, Reed of Missouri and Fall of New Mexico, the Republican manifesto was regarded as in part at least a political move designed to embarrass the Administration.

A resolution, introduced by Senator Lodge but not voted on, read as follows:

Whereas, Owing to the victory of the arms of the United States and of the nations with whom it is associated, a Peace Conference was convened and is now in session at Paris for the purpose of settling the terms of peace; and,

Whereas, A committee of the conference has proposed a constitution for a League of Nations, and the proposal is now before the Peace Conference for its consideration;

Now, therefore, be it resolved, by the Senate of the United States in the discharge of its constitutional duty of advice in regard to treaties, that it is the sense of the Senate that while it is the sincere desire that the nations of the world should unite to promote peace and general disarmament, the constitution of the League of Nations in the form now proposed to the Peace Conference should not be accepted by the United States.

THE PRESIDENT'S NEW YORK SPEECH.—On March 4, on the eve of his return to France, President Wilson spoke at the Metropolitan Opera House in New York. Without entering into a detailed defence of the League Covenant, the President declared that he was amazed at the ignorance regarding the state of the world displayed by its opponents.

"I have heard," he said, "no constructive suggestion, I have heard nothing except 'will it not be dangerous to us to help the world?' It would be fatal to us not to help it." He added that, far from involving us in entangling alliances, the League is "an arrangement which will disentangle all the alliances in the world." The President declared his confidence that the sentiment of the country was behind him.

EX-PRESIDENT TAFT SUPPORTS LEAGUE.—The speech of President Wilson in New York was preceded by an address by ex-President Taft, in which he met in detail the arguments against American support of the League. Mr. Taft declared that our danger from foreign combinations would be greater without the League than with it; that the League covenant contained no provision preventing a country from resisting invasion, such as a border raid from Mexico; that the furnishing of military force to support League decisions would be voluntary rather than compulsory; that the covenant created no super-sovereignty; and that a treaty agreement limiting the power of Congress to make war or to increase armaments was constitutional, as shown by many precedents, such as the agreement with Great Britain not to fortify the Canadian frontier.

Mr. Taft, suggested that there should be some provision in the League plan for withdrawal from the League after reasonable notice. Appropriate words he thought might also be added to show that troubles in any continent would be the primary concern of nations of that continent, or hemisphere. This he considered clearly implied, but its explicit statement would relieve anxiety about European or Asiatic interference in America.

GERMANY

BAVARIAN PREMIER MURDERED.—Kurt Eisner, the Independent Socialist Premier of Bavaria, was shot on the streets of Munich on February 21. The assassin was Count Arco Valley, a Bavarian aristocrat and former officer. The murder was reported to be due to Eisner's exposure of the war guilt of the German military authorities and their inhuman treatment of prisoners of war, made at the Berne Socialist Congress, together with his later statement in Munich that he had documentary evidence to prove that the German general staff continued, even then, to carry on secret dealings with the Russian Reds.

According to the statement of a Geneva correspondent of the *N. Y. Times,* on February 25, ex-Crown Prince Rupprect of Bavaria returned from Switzerland to Bavaria on the day after this declaration by Eisner, and his return was probably connected with the event that followed. On the night preceding the assassination, several officers of the Bavarian Light Guards, in which Valley served, met and tossed dice to decide which should murder the Premier.

The murder was at once utilized by Bavarian Sparticides. When Herr Auer, Minister of the Interior, arose in the Diet to announce the murder of Eisner, a volley was fired from the gallery, seriously wounding the Minister and one of the deputies on the floor of the House. The Munich Central Council of Workmen and Soldiers took control, however, and on February 24 elected a provisional ministry including a majority of Moderate members—four Majority Socialists, three Independent Socialists, one member of the Peasant party and one Bourgeois. The Sparticides were thus barred out, and the government undertook concentration of troops to suppress their activities. On March 8 it was announced that the Diet would be convoked, in the expectation that it would confirm the new Socialist ministry.

BERLIN RIOTS.—On March 3 a general strike was declared in Berlin. All traffic stopped, and the city for a time was without water, electricity or gas. The strike was the result of a resolution passed on March 2 by the Workers' Council of Berlin by a bare majority over the Moderate members. Various armed bands, such as the "People's Republican Guard" and "Marine Guard" were organized by the Sparticides to carry out a reign of terror.

Government troops at once closed in on the rebel forces, besieged their strongholds, and by the end of the week controlled the city, with the exception of certain suburbs. On March 8 the Majority Socialists of the Berlin Workmen's Council bolted and declared the strike off.

The later fighting during the week March 9–15 was marked by increasing savagery on both sides. As a result of Sparticide atrocities, Herr Noske, Secretary of Military Affairs, on March 10 declared no quarter to rebels captured with arms. An estimate of March 17 placed the number killed on both sides at over 1000, and the damage at over 40,000,000 marks.

RUSSIA

BALTIC PORTS TAKEN FROM REDS.—The ports of Libau and Windau, in Courland on the Baltic Sea, which were taken by the Bolsheviki on January 31, have been recaptured.

Windau was retaken by the Germans by a simultaneous land and sea attack after a violent battle, according to a Berlin dispatch.—*N. Y. Times,* 27/2.

WORK OF BOLSHEVIKI FORCES.—The Moscow general staff claims that in January and February the Red army reoccupied territory as large as France, with 1055 miles of railway. The Red army, adds the communique, will reach Archangel May 1.—*Washington Post,* 15/3.

POLAND RECOGNIZED BY ALLIES.—On February 21 formal announcement was made by the Supreme Council in Paris that the Allies would extend recognition to the Polish Government headed by M. Paderewski. On March 5 an Interallied Commission left Paris to arrange new armistice terms between the Germans and Poles. At a meeting of the Polish National Assembly on February 20 General Joseph Pilsudski was again made Chief of State, subject, however, to the will of the Assembly.

FAR EAST

KOREAN INDEPENDENCE AGITATION.—Independence demonstrations verging on revolt occurred in Korea during the first week of March. Thousands of demonstrators were arrested, and the Japanese soon had the movement under control. According to a Shanghai dispatch of March 14, upwards of 100 persons were killed in rioting.

President Wilson, according to a Washington dispatch of March 16, was asked by the Korean National Association to initiate action at the Peace Conference looking toward the independence of Korea, under a mandatory issued by the League of Nations.

JAPAN AND THE PACIFIC ISLANDS.—Japan has no moral right to possession of the South Sea Islands taken from Germany and now under Japanese occupation, nor is any other nation entitled to ownership of this territory, according to Professor Sakuzo Yoshino, of the Tokyo Imperial University, who, in *The Japan Advertiser* of that city, suggests a plan for control of the islands that is practically the same as President Wilson's, namely, that they should be placed in charge of a League of Nations or an Interallied commission responsible for the education of the natives until they become civilized and competent to settle for themselves all questions of their future. If Japan should be this guardian, it is predicted, the islands might eventually be annexed to Japan. An official outline of Japan's intentions is given in Paris cables by Baron Nobuaki Makino, senior Japanese delegate to the Peace Conference, who says of the Marshall and Caroline groups of islands, peopled by wild and practically savage tribes, that Japan claims the right to "occupy these islands for purposes of peaceful development." Japan contends, and will continue to contend, that she shall control the islands north of the equator, and it is her conviction that "the handing over of the supervision of these islands would be a just recognition of what services we rendered in maintaining the commerce of the Pacific and assisting our allies in the Indian Ocean and the Mediterranean." An official statement of Australia's views is given in Paris also by Premier William M. Hughes, who maintains that of the former German island possessions Australia claims full control of all lying below the equator, except Samoa, which should go to New Zealand, and that part of New Guinea which is in Dutch possession. What Australia wants is a settlement of the Pacific island question by the Peace Conference, the Premier is further quoted as saying, "such as she is entitled to have, one that will insure her national safety and guarantee her industrial, social, and racial policies." Australia prefers not to accept the mandate principle, but if compelled to do so "it is imperative that we must make the same laws and have over the new territories the same powers as we exercise over Australia.

Professor Yoshino foresees a competition in colonial policies among the Powers entirely different from that of the past. The fundamental feature in this competition will be the education of the people in the colonies so that they become competent to manage their own affairs. Formerly, we

are reminded, rivalry among the Powers in the development of colonies was based on the building up of commerce and industry. Under the new order of things, he points out that—

"If Japan be able to educate the inhabitants of the South Sea Islands rightly, giving them such civilization as to make them self-governing, when the time comes that other Powers recognize the ability of the inhabitants to determine their own future they declare that they are desirous of becoming part of Japan, to which they owe their civilization and prosperity, Japan will properly be able to say that she made a great success. I am thinking always that the colonial policy of Japan, as well as that of all other Powers, should be changed as the result of the war, and in this respect I am confident that the questions arising regarding the settlement of the German colonies will prove helpful in bringing the Powers over to a new method and a new principle in their colonial policies."—*Literary Digest*, 22/2.

THE INDUSTRIAL PROGRESS OF JAPAN

An article in *Engineering* (London, February 21) gives an extended and highly interesting account of Japanese railroad and industrial development in the present century, during which she has grown into a great industrial nation, competing with western powers for the markets of the east. The latter part of the essay, dealing with Japan's advance into China, is as follows:

That Japan would eventually reach a state of industrial independence was without doubt to be expected, but her industrial domination of China was not; and yet it is possible, for the Japanese Government is doing everything it can to secure it. Thus Finance Minister Shoda in May, 1918, in an address to a general meeting to the bankers of Western Japan, emphasized the need for independent sources of supply for necessaries and expressed dissatisfaction at the amount of Japanese money invested in China although this amounted to 9,800,000*l.* in the year 1917 alone, not quite as much as Japan's total investment in the country previous to the war. He also said that for the encouragement of investment abroad, the government had decided to guarantee principal and interest to the amount of 10,000,000*l.* in the Industrial Bank of Japan. This is sufficient indication of the government attitude, and the further increase of Japanese power in China is to be feared for the following reasons, which give very little hope of the maintenance of the Open-Door policy under a dominant Japan.

Thus in the leased territory in Manchuria and in her colonies Japan has always stifled all competition either by high preference rates or by methods more questionable, as in Manchuria, where Chinese banks are compelled to cash a full face value note depreciated to the amount of 40 per cent or over, if presented by Japanese nationals.

Methods like these, coupled with the notorious partiality of Japanese law courts, whether consular or otherwise, effectually discourage competition even without the fear that any competing business would not be killed immediately by transport difficulties on Japanese-controlled railways.

Further no selection has been enforced by the government in the matter of emigrants, with the consequence that the name of Japan is continually being discredited in China by undesirables who seem to form the bulk of Japanese emigrants, judging from the disreputable trades engaged in and the low standard of their trade morality.

In addition, the government itself has at least laid itself open to the suspicion of fostering the continuance of the disastrous and wasteful war between North and South China, which has been going on since 1916, for she has lent money wholesale to North China, well knowing that there

COMMUNICATIONS IN THE FAR EAST.

was at least considerable doubt about the loans ever being used for their ostensible purposes. Among the most notorious of these loans was the Arms loan of 1917 for 4,000,000*l.*, said to be for the equipment of the Chinese expeditionary force for the European war, but without doubt in part used for the purchase of war material for the war against the South. Among other exceedingly questionable loans may be enumerated the Telegraph loan, previously mentioned, the proceeds of which were undoubtedly used for the war, a loan of 300,000*l.* to the rebel southern government in February, 1917, secured on the Canton cement works, a further loan of 200,000*l.* to the rebel southern governor of Hunan secured on iron mines in Anhui and antimony mines in Hunan, and lastly a loan known as the Military loan of unknown amount, said to be 4,000,000*l.*, the terms of which are secret, but are supposed to provide for the military reorganization of China under Japanese supervision.

Summarizing the above we find the British manufacturer confronted with the almost total loss of the Japanese market, worth over 12,000,000*l.* in 1912 and then on the increase, and also with a very clever competitor in what promises to be one of the world's greatest markets. Further this competitor has the great advantage of proximity, strong government backing both moral and financial, very low wages and a standard of living infinitely below ours, and last but not least a laxity of trade morals, coupled with great tenacity of purpose. It should also be remembered that since the war Japan has entered the market against us in almost every branch of Western industry, that their goods are at any rate extremely attractive, and have, in some cases, particularly as regards electrical goods and cement, proved very satisfactory, though in the great majority of cases they are inferior in quality, a defect largely counterbalanced by their cheapness, which appeals irresistibly to the half-trained mind.

Japanese industrial strength lies in organizing and imitative ability, her adequate finance of industry which insists on getting the best and most up-to-date even if of foreign origin, and her supply of cheap labor, even in the case of the skilled artisan class.

Japan's weakness lies in her lack, amongst some classes, of that high standard of trade morality which is so necessary to establish credit and reputation, her mineral poverty, her dependence on outside sources for much of her food supply and all her wool supply, and the popular dislike of immigration, for out of 55,000,000 people, only 500,000 are resident abroad, while very many of these are undesirables.—*Engineering* (*London*), 21/2.

REVIEW OF BOOKS
ON
SUBJECTS OF PROFESSIONAL INTEREST

"Ship Stability and Trim." By Percy A. Hillhouse, B. Sc. M. I. N. A., 297 pages. Price $4.50 net. (London: John Hogg, 13 Paternoster Row, 1918. Distributors, D. Van Nostrand Company, New York.)

The author has summed up the scope and purpose of this book in the Foreword as follows:

"The aim of the writer of the present volume has been to treat the problems of stability more fully than is possible in a work covering the whole range of Naval Architecture, while avoiding the more deeply mathematical portions of the subject and considering its practical rather than its theoretical aspects.

"A knowledge of the elements of stability is of primary importance in both naval and mercantile services. The Board of Trade has now included the subject in their examinations for masters, and it is hoped that *Ship Stability and Trim* will prove to be of practical value to all who have to do with the designing, loading, or ballasting of ships or other floating bodies."

While the author states that he has avoided the more deeply mathematical portions of the subject of stability no one will quarrel with the lack of mathematics in Chapter IV, where he deals with the height of metacenter in bodies of simple form. The reader may, however, omit this portion of the book without seriously impairing its value for imparting knowledge on the subject of ship stability. The mathematics throughout is made so simple and is illustrated by such understandable diagrams that anyone with a working knowledge of arithmetic should be able to grasp the underlying theory of stability therefrom. The author is particularly happy in his explanation of moment inertia in Chapter IV.

The effect of wind on stability is given a well-deserved chapter. In these days of increasing freeboard of merchant vessels the influence of wind pressure on the stability curve is of considerable importance.

An interesting and instructive chapter is devoted to free water, with a discussion on the relative merits of longitudinal and transverse subdivision, and an explanation of the reasons which led the International Convention for the Safety of Life at Sea to give preference to transverse watertight subdivision.

The portion of Chapter IX which is devoted to the subject of stability when docking is particularly valuable because this subject is generally not touched upon in works on Naval Architecture. The author explains very clearly how, by the use of the displacement and stability data furnished

by the builders, calculations can be made to determine whether a condition of instability will result when the vessel lands on the blocks. It is to be regretted that the author did not add a chapter on stability and trim conditions when a vessel lies stranded in various positions. Salvage operations can frequently be hastened and can usually be given an extra chance of success by careful study of these conditions. However, the discussion on stability when docking covers the theory which should be applied to the stability of a stranded vessel.

The book admirably serves the purpose for which it was written.

J. A. F.

"Marine Gas Engines." By Carl H. Clarke. (Published by D. Van Nostrand Company.)

This book describes the construction and principles of operation of the various standard types of gas and oil engines in plain and simple language so that it may be easily understood by anyone interested in power obtained by the internal combustion of gas and oil fuels. As its title implies, the volume is intended primarily for the users of marine gas engines. No attempt is made to deal with the subject matter from a theoretical or thermodynamic standpoint. It is well illustrated and arranged and has been brought up to date by the addition of material on oil and Diesel engines in accordance with recent developments along these lines.

The book is divided into 15 chapters, of which Chapter V on Ignition Devices is very complete and will prove to be a valuable assistance to all operators who desire to master this source of trouble.

On the whole the book covers its field in a capable manner and although the author does not describe the particular types of machines in use in the naval service, he covers the methods and principles of operation thereof so that it should find a wide field in the service, due to the fact that the writer covers the topic in a style that will satisfy all inquiring minds on the subject of the construction and management of marine gas engines.

W. L. L.

"The British Navy in Battle." By A. H. Pollen. Price, $2.50. (New York: Published by Doubleday, Page & Co.)

CHAPTER I. A GREETING BY WAY OF DEDICATION

Mr. Arthur Pollen commences his work by a glowing tribute to the officers and men of the Royal Navy. In his opinion the British Admiralty was faultily organized and carried out an inefficient policy; these mistakes, however, were more than counterbalanced by the thoroughness and efficiency of the officers and men of the navy at sea face to face with the enemy. But let Mr. Pollen speak for himself:

"Take it all in all, never in the history of war has organized force accomplished its purpose at so small a cost in unpreventable loss, or with such utter thoroughness, or in face of such unanticipated difficulties.

"It was inevitable that there should be some failures. Not every opportunity has been seized, nor every chance of victory pushed to the utmost. Who can doubt that there are a hundred points of detail in which your material, the methods open to you, the plans which tied you, might have been more ample, better adapted to their purpose, more closely and wisely considered? For when so much had changed, the details of naval war had to differ greatly from the anticipation. In the long years of peace—that seem so indefinitely far behind us now—you had for a generation and a half been administered by a department almost entirely civilian in its spirit and authority. It was a control which had to make some errors in policy, in provision, in selection. But your skill counterbalanced bad policy when it could; your resources supplied the defects of material; too few of you were of anything but the highest merit for many errors of selection to be possible.

"And the nation understood you very little. Your countrymen, it is true, paid you the lip service of admitting that you stood between the nation and defeat if war should come. But war seemed so unreal and remote to them, that it was only a few that took the trouble to ask what more you needed for war than you already had.

"And you were too absorbed in the grinding toil of your daily work to be articulate in criticism; too occupied in trying to get the right result with indifferent means—because the right means cost too much and could not be given to you—to strive for better treatment; too wholly wedded to your task to be angry that your task was not made more easy for you. Hence, you took civilian domination, civilian ignorance, and civilian indifference to the things that matter, all for granted, and submitted to them dumbly and humbly, as you submitted silent and unprotesting to your other hardships; you were resigned to this being so; and were resigned without resentment. If, then, the plans were sometimes wrong, if you and your force were at other times cruelly misused, if the methods available to you were often inadequate, it was not your fault—unless, indeed, it be a fault to be too loyal and too proud to make complaint."

CHAPTER II. A RETROSPECT

This chapter was written in August, 1918, and in it Mr. Pollen makes a broad survey of the war on the sea as carried out up to that time. After calling attention to the fact that reversals in the land warfare had been frequent and startling, he shows that the various crises which occurred in the war on the sea, while fewer in number, were more extreme: "This has not been the case at sea. The transformations here have been fewer; but they have been extreme. For two and a half years the sea power of the Allies appeared so overwhelmingly established and so abjectly accepted by the enemy, that it seemed incredible that this condition could ever alter materially. Yet between the months of February and May, 1917, the change was so abrupt and so terrific that for a period it seemed as if the enemy had established a form of superiority which must, at a date which was not doubtful, be absolutely fatal to the alliance. And, again, in six months'

time, the situation was transformed, so that sea power, on which the only hope of allied victory had ever rested was once more assured."

Mr. Pollen then proceeds to trace the four great crises of the war on the sea. During August, 1914, the British command of the sea had seemed complete. But soon the tide seemed to be turning in the favor of the Germans and doubt began to creep into British minds as to whether the British Navy could retain the supremacy. Let Mr. Pollen describe the situation:

"During September an accumulation of errors came to light. The enormity of the political and naval blunder which had allowed *Goeben* and *Breslau* to slip through our fingers in the Mediterranean, and so bring Turkey into the war against us, at last became patent. There was no blockade. There were the raids which *Emden* and *Karlsruhe* were making on our trade in the Indian Ocean, and between the Atlantic and the Caribbean. The enemy's submarines had sunk some of our cruisers—three in succession on a single day and in the same area. Then rumors gained ground that the Grand Fleet, driven from its anchorages by submarines, was fugitive, hiding now in one remote loch, now in another, and losing one of its greatest units in its flight. For a moment it looked as if the old warnings, that surface craft were impotent against under-water craft, had suddenly proved true. Von Spee, with a powerful pair of armored cruisers, was known to be at large. As a final insult, German battle cruisers crossed the North Sea, and battered and ravaged the defenseless inhabitants of a small seaport town on the west coast. Something was evidently wrong. But nobody seemed to know quite what it was."

These events caused the first crisis. Prince Louis of Battenburg was relieved from his post as First Sea Lord and Lord Fisher appointed in his place. The situation now changed as if by magic. *Emden* was destroyed; Von Spee's squadron, with the exception of *Dresden*, was sunk; *Karlsruhe* disappeared and finally, in the battle of the 24th of January, Hipper was driven back with the loss of the cruiser *Blucher*. The Churchill-Fisher administration at the Admiralty was apparently completely successful. But this success was not caused by any efficiency of the Admiralty administration. The loss of *Karlsruhe* was a pure accident. The destruction of *Emden* was an event which had to come sooner or later. It is true that Lord Fisher gains the credit for the sending of the battle cruisers to the Falkland Islands in search of Von Spee, but the instant success of Sturdee's mission was merely an astonishing piece of luck. The battle of the 24th of January was really far from creditable to the British, as Mr. Pollen shows in his detailed description of this action.

The second crisis soon took place. The Germans commenced their first submarine campaign against merchantmen in February, 1915. The naval attack upon the Dardanelles was a total and disastrous failure. The people began to see the real lesson of the escape of Hipper's cruisers. "The German battle cruisers escaped at Heligoland for exactly the same reasons that the attempt to take the Dardanelles forts by naval artillery was futile. We had prepared for war and gone into war with no clear doctrine as to what war meant, because we lacked the organism that could have produced

the doctrine in peace time, prepared and trained the navy to a common understanding of it and supplied it with plans and equipped it with means for their execution. What was needed in October, 1914, was not a new first sea lord, but a higher command charged only with the study of the principles and the direction of fighting." Mr. Churchill was relieved as first lord by Mr. Balfour and Lord Fisher was relieved by Sir Henry Jackson. Again the tide seemed to turn in favor of the British, for the submarine campaign died down in October, 1915, and although revived again in March, 1916, was stopped then by the threat of American intervention. The British supremacy was seemingly definitely proved by the results of the battle of Jutland, which showed to both the British and the Germans that the German High Seas Fleet could never gain the command of the seas.

But the unsatisfactory ending of this battle caused a great controversy. "The critics established themselves in two camps. One side was for facing risks and sinking the enemy at any cost. The other would have it that so long as the British Fleet was unconquered it was invincible, and that the distinction between 'invincible' and 'victorious' could be neglected. After all, as Mr. Churchill told us, while our fleet was crushing the life out of Germany, the German Navy could carry on no corresponding attack on us; and when the other camp denounced this doctrine of tame defense, he retorted that victory was not only unnecessary but that the torpedo had made it impossible.

"Yet, within two months of the battle of Jutland, the submarine campaign had begun again, and, at the time of Mr. Churchill's rejoinder, the world was losing shipping at the rate of three million tons a year. As there had never been the least dispute that to mine the submarine into German harbors was the best, if not the only, antidote, never the least doubt that it was the German Fleet that prevented this operation from being carried out, it seemed strange that an ex-First Lord of the Admiralty should be telling the world, first, that the German Fleet in its home bases delivered no attack on us and therefore need not be defeated! And, secondly, as if to clinch the matter and silence any doubts as to the cogency of his argument, we were to make the best of it because victory was impossible."

The German submarine campaign of the fall of 1916, therefore, brought on the third crisis. "Once more the old wrong remedy was tried. The government and the public had learned nothing from the revelation that we had gone to war on the doctrine that the fleet *need* not, and *ought* not, to fight the enemy, and were apparently unconcerned at discovering that it *could* not fight with success."

While Admiral Jellicoe came to the Admiralty as relief of Sir Henry Jackson the system remained unchanged. The situation grew worse rather than better. "Thus, without having lost a battle at sea—but because we had failed to win one—a complete reverse in the naval situation was brought about. Instead of enjoying the complete command Mr. Churchill has spoken of, we were counting the months before surrender might become inevitable. During the 10 weeks leading up to the culminating losses of April, a final effort was made to make the public and the government realize that failure of the Admiralty to protect the sea-borne commerce of a seagirt people was

due less to the government's reliance on advisers ill-equipped for their task, than that the task itself was beyond human performance, so long as the higher command of the navy was wrongly constituted for its task.

"But when reason and argument had been powerless to prevail, the logic of facts gained the victory. At last, in the fourth crisis of the war, it was realized that changes in personnel at Whitehall were not sufficient, that changes of system were necessary. Before the end of May the machinery of administration was reorganized and a higher command developed, largely on the resisted staff principle."

The principal result of the inauguration of the new system was the establishment of the convoy system which saved the situation as far as the submarines were concerned; but while the system had been changed the persons identified with all the previous failures and who were responsible for the methods and plans that had led to them remained in power. In January, 1918, however, Admiral Wemyss relieved Admiral Jellicoe as first sea lord and Sir Eric Geddes became first lord. From this point on the British naval policy was changed from a passive defensive to a strong offensive. Sir Roger Keyes was appointed to the Dover command and a mine barrage was laid across the Straits of Dover. At the same time another great mine-field was laid across the North Sea from Scotland to the Norwegian coast, and still another was laid in the Kattegat. A very successful raid was made into the Kattegat and Sir Roger Keyes carried out two splendid attacks on the German bases at Zeebrügge and Ostend. The entire situation had been changed and the old supremacy on the sea was definitely assured.

CHAPTER III. SEA FALLACIES

Mr. Pollen defines the ideas regarding the navy and sea power which were held by the British people. Among the many false ideas the two chief ones were the idea at the beginning of the war that battleships were everything, and the later idea that battleships were useless and that submarines were supreme.

"He was wrong then and he is wrong now. It was an error to think of sea power only in terms of battleships. It is a still greater error to suppose that sea-power can exist in any useful form unless based on battleships in overwhelming strength."

CHAPTER IV. SOME ROOT DOCTRINES

There were two schools of thought regarding the navy before the war. One was for the gaining of the decision by fighting. The other idea was to have such a superiority in strength as to gain the victory without having to fight. The later school predominated. According to Mr. Pollen "we showed that our policy was not to attack but to wait attack, and then not to do anything to compel the enemy to attack."

The ideas of the two schools are described by Mr. Pollen as follows: "But in recent history we have witnessed the curious spectacle that an inversion of the order of these two statements did actually create two

different and opposed schools of naval thought. The first school saw in victory the first and constant preoccupation of the fleet. It concerned itself, therefore, chiefly with the essentials to victory, and as victory can only come from fighting it was at the elements of fighting that it worked. It sought to find the most perfect methods of using weapons because it realized that it was only from the evolution of these that right tactics could be deduced. It studied the campaigns of the past to discover the two great groups of doctrines that our fighting ancestors have bequeathed to us, the first dealing with the science of strategy, the second with the principles of command. They realized that weapons and the ships that carry them do not fight themselves but must be fought by men; and they wished those men rightly educated and trained in the subtle and complex science of their high calling. To them, in short, sea war was an affair of knowledge applied by men trained both in the wisdom and in the lofty spirit of those that had excelled in the naval war before. And, faithful to the traditions of the past, no less than eager for research into all the undeveloped potentialities of the products of modern progress, they pinned their faith on their ability to force the enemy to battle, and to beat him there when battle came.

"The other school went for a short cut to naval triumph. If only they could get a fleet of ships so big, so fabulously armed, so numerous as to make it seem to the enemy that his fleet was too feeble to attack, why then battle would be made altogether superfluous, and no further worry over so unlikely a contingency was necessary. They did not, therefore, trouble to inquire either into the processes needed for bringing battle about, or into what was necessary for success when battle came. They passed on to the contemplation of what can only be the fruit of victory—as if victory were not a condition precedent!

"It was, unfortunately, this group, hypnotized by a theory it did not understand, which controlled naval policy in Great Britain for the 10 years preceding the war, and for the first three and a half years of it. Their error lay, of course, in supposing that a fleet, so materially strong and numerous that its defeat was unimaginable because no attack on it could be conceived, must—so long as any serious lowering of its force by attrition was avoided—be the military equivalent to one which had already defeated the enemy; that 'invincible' and 'victorious' were, in short, interchangeable terms. So masterful was this obsession that their apologists—shutting their eyes to the obvious and appalling consequences of this creed in action—two years after the event, still regarded the only encounter between the main fleets in this war as a great victory, because the larger, by avoiding the risk of close contact with the lesser, came out of the conflict with forces as substantially superior to the enemy's as they were before the opportunity of a decisive battle had been offered."

CHAPTER V. ELEMENTS OF SEA FORCE

In this chapter Mr. Pollen describes the policy of the Admiralty in more detail. In 1909 the war staff was instituted but was never given real power.

"But the war staff was never put into the position to discharge the functions which the 1909 committee had designated as its main purpose. So

far from being an authority equipped for the exhaustive study of war and how to prepare for it, the whole apparatus of fighting was carefully excluded from its purview. It had no connection with the departments administering gunnery, torpedoes, submarines, aircraft, or mines. As to some of these activities, there were as a fact no departments solely charged with their control before the war staff was instituted. They were not entrusted to the war staff. And no new staffs were created! If the strategical vagueness, to which the Beresford committee had borne witness in 1909, arose largely, as many supposed, from the uncertain state of naval technique, then, so far as the war staff was concerned, this vagueness had to continue—for technique was not their concern."

After discussing the proper naval strategy for the battle fleet and the submarines, Mr. Pollen says:

"Thus, if there was one form of offensive imperatively imposed on us, it was that of naval artillery; and if there was one form of defensive not less imperatively incumbent, it was the provision of adequate protection against submarines.

"It is now, of course, common knowledge that it was exactly in these two particulars that Admiralty policy from 1904–1914 was either discontinuous, vacillating, and self-contradictory, or simply non-existent. So far as it cultivated anything, it was a defensive tactics for the gun and offensive tactics for the submarine!"

CHAPTER VI. THE ACTIONS

The author now gives a rapid summary of the actions fought during the war and brings out the fact that there was no tactical doctrine in the British Navy. He lays special emphasis upon the strongly contrasted tactics of Beatty and Jellicoe at the battle of Jutland.

"There is no getting out of this dilemma. If Admiral Jellicoe was right in refusing to face the risks inseparable from a resolute effort to make the battle decisive, then Sir David Beatty must have been wrong to have fought in a way which cannot be intelligently explained except on the basis that from first to last he had decisive victory as his object. If the tender care that brought the Grand Fleet through the action with hardly a man killed and only two ships touched was right and wise, then the clear vision, all the more luminous for seeing and counting the cost, which exposed *Indefatigable, Queen Mary,* and *Invincible* to destruction, was woefully wrong. Now it seems extraordinary, if the strategy of waiting to fight till the Germans attacked was right—if this was the Admiralty doctrine—that it was not communicated to Sir David Beatty as well as to Sir John Jellicoe. If it was axiomatic to avoid the risk of ships being destroyed, so that Admiral Moore was right to break off the action at the Dogger Bank and Admiral Jellicoe right in letting the enemy 'open the range under the cover of torpedo attacks,' why was not Admiral Beatty forbidden to jeopardize his ships, and Admiral Arbuthnot warned against any pursuit of the enemy's cruisers or destroyers, that might possibly bring him within range of the German gunfire? How are we to explain Bingham's attack on the head of the German line or Goodenough's recon-

naissance which brought him under the salvoes of the German guns at 12,000 yards? Is the doctrine of caution and ship conservation to apply only to battleships and not to battle cruisers, armored cruisers, light cruisers, and destroyers? Is it only the battle fleet that is not to fight except when it risks practically nothing by doing so? All these questions are forced to the student's attention when he reviews the events here recorded."

CHAPTER VII. NAVAL GUNNERY, WEAPONS AND TECHNIQUE

In this chapter Mr. Pollen gives a clear description of naval gunnery and torpedo fire intended for the civilian reader.

CHAPTER VIII. THE ACTION THAT NEVER WAS FOUGHT

In a comparison of forces at the beginning of the war Mr. Pollen allows the British 20 dreadnoughts and 4 battle cruisers ready for sea—failing to count 3 battle cruisers in the Mediterranean, 1 in a dockyard and 1 in the Pacific. The Germans were allowed 15 dreadnoughts and 4 battle cruisers ready for sea. He, therefore, makes the forces 24 to 19.

Jane's Fighting Ships for 1916 gives the British 22 dreadnoughts in commission in August, 1914, including *Erin* and *Agincourt*, and 9 battle cruisers. Not counting the battle cruiser in the Pacific, this gives a total of 30 ships. In addition, *Agamemnon* and *Lord Nelson* were practically dreadnoughts, with their batteries of four 12-inch and ten 9.2-inch guns. Had the British not been willing to fight without their battle cruisers in the Mediterranean and in the dockyards, they could certainly have delayed a decisive action until they rejoined and if necessary until *Agincourt* and *Erin* were commissioned.

Jane gives the Germans 13 dreadnoughts and 5 battle cruisers, of which *Goeben* was in the Mediterranean. The two ships of the *König* class which Mr. Pollen counts as ready were commissioned in October according to the same issue of Jane. Thus the real odds would be nearer 30 to 17 than 24 to 19. In this connection it is interesting to note that Commander Gill gives the figures as 33 to 20, counting in ships which he calls practically completed and including *Goeben*. When you consider that the British had 40 pre-dreadnoughts to Germany's 20—and they were far better ships—34 armored cruisers to 9 and a great superiority of cruisers, destroyers and submarines—the submarine figures being 78 to 30—you will see that the Germans did not have nearly the chances of gaining the command of the sea which Mr. Pollen believes they had.

Mr. Pollen then goes ahead to sketch out what the Germans might have done. First, *Goeben* should have been ordered home. Second, the three Austrian dreadnoughts should have come to Kiel with the pretext of taking part in a review. Third, a surprise night attack should have been made upon the British Fleet before the declaration of war. Fourth, 100 merchant vessels, armed with 4-inch guns, should have been sent to sea as raiders. Fifth, a landing force of 150,000 men should have been landed in England.

This is all very interesting. The reader will have to judge for himself as to whether the British would have been blind and careless enough to have allowed the success of this plan.

CHAPTER IX. THE DESTRUCTION OF "KÖNIGSBURG"

Mr. Pollen quotes a very interesting account of the two attacks of the *Mersey* and *Severn* on *Königsburg*, written by an officer who took part. The first attack was a failure but the second was completely successful. Spotting was done by airplane and proved very efficient. It is interesting to note the gallant action of the observer in the plane, who continued to send out spots after his plane had been hit and was coming down out of control. Mr. Pollen concludes the chapter with the following statement:

"Nothing could better illustrate the curious individualism which governs the organization of our sea forces. Each ship, each squadron, each fleet seems to come to the study of these things as if they were virgin problems, entirely unaided by advice or information from the central authorities, so that there is not only no uniformity of practice—in itself a not unmitigated evil—but what is really serious, a total absence of uniformity of knowledge. I am the last person in the world to suggest that all naval affairs should be regulated in every petty detail from Whitehall. There are quite enough forces at work to repress freedom of thought or restrict liberty to investigate and experiment in the fullest possible way. But there is surely the widest possible difference between a restraining tyranny and an intelligent system of communicating proved principles and the results of successful practice."

CHAPTER X. CAPTURE OF H. I. G. M. S. "EMDEN"

The destruction of *Emden* by *Sidney* is very well described.

CHAPTER XI. THE CAREER OF VON SPEE—CORONEL

Von Spee's strategy is investigated in an interesting way.

In order to clear up some doubt as to the strength of the opposing forces at Coronel, it is interesting to note that the displacement of the British ships was 95 per cent of that of the German ships; their total metal was 67.6 per cent of the German and the metal fired in one broadside was 64.8 per cent. The British had slightly superior speed and their 9.2- and 6-inch guns were 45-caliber against the 40-caliber 8.2- and 5.9-inch guns of the Germans. The German armored cruisers were about 5 years newer than the British, but the *Glasgow* was newer than the German light cruisers. Everything considered, the British strength was probably about 70 per cent of the German. The fact that Craddock fought under adverse light conditions and on such a course that his lower guns could not be used when he had the superior speed is not entitled to consideration. The British made six hits in all, wounding two men. Craddock cannot be blamed, however, for his decision to fight. He had much to gain and many advantages on his side. His heroism will long be remembered by the world.

CHAPTERS XII–XV. BATTLE OF THE FALKLAND ISLANDS

These chapters are among the most interesting in Mr. Pollen's book. There is much original discussion, which is very carefully thought out. It is difficult to agree with a few of his points, but these concern such indefinite questions that it is a matter merely of one opinion against another. While the British did their business in a most thorough manner the most interesting fact of this action, in my opinion, is the splendid gunnery of the Germans. *Scharnhorst* and *Gneisenau* scored 25 hits with 8.2-inch 40-caliber guns against ships which threw 4.1 times their broadsides. *Nurnburg* scored 36 hits on *Kent*, a vessel having over 4 times her weight of broadside. *Leipsic* scored 18 hits on *Cornwall* and caused a loss of 1 killed and 5 wounded on *Glasgow*—the number of hits is not given.

Mr. Pollen discusses at length the important question as to whether a superior force should fight at long or short range. He concludes after a very able analysis that the results will be about the same in both cases, but that the time required in a close action to defeat the enemy will be but one-third to one-fifth of that required if a long range engagement is to be fought.

CHAPTER XVI. THE HELIGOLAND AFFAIR

This action is very capably described. The British, and especially Sir David Beatty, deserve great credit for their splendid work in this affair.

CHAPTERS XVII–XVIII. THE ACTION OFF THE DOGGER BANK

Mr. Pollen's description of this battle is excellent. It was very unfortunate for the British that the flagship of Sir David Beatty was disabled, as this gave the command to an officer who lacked the resolution to continue the pursuit. This failure to push the enemy when great results might have been obtained and the official reports of the Admiralty are severely criticized by Mr. Pollen.

"This being the situation, it seems to me most unfortunate that the Admiralty followed the course they did in communicating their various accounts of this action to us. For there were three accounts given, and no two of the three agreed as to the reason why the pursuit was broken off! For two days we were not told that *Lion* was injured, and for four days were ignorant of the fact that the control of the British Fleet had passed out of Sir David Beatty's hands some time before the action was ended. It was not till March 3—that is, five weeks after the action—that we were told the name of the officer on whom command had devolved when *Lion* fell out of line! This suppression was really extraordinary. To be mentioned in despatches had always been an acknowledged honor. To be ignored was a new form of distinction. How was the public to take so singular an omission? Had it ever happened before that an officer had been in command of a fleet at so grave a crisis and the fact of his being in command suppressed in announcing the fact of the engagement? No one quite

knew how to take it. The discrepancies in the *communiqués* are worth noting. In the first, of January 25, was this curiously worded paragraph:

"'A well-contested running fight ensued. Shortly after one o'clock *Bluecher*, which had previously fallen out of the line, capsized and sank. Admiral Beatty reports that two other German battle cruisers were seriously damaged. They were, however, able to continue their flight, and reach an area where dangers from German submarines and mines prevented further pursuit.'

"Did whoever drafted this statement suppose that the *Bluecher* was a battle cruiser? We are now, however, more concerned with the reasons given for breaking off the action. An area was reached where 'dangers from German submarines and mines prevented further pursuit.' The *communiqué* of January 27 was silent on this point. On the 28th was published what purported to be 'a preliminary telegraphic report received from the vice admiral.' The paragraph dealing with this matter is as follows:

"'Through the damage to *Lion's* feed tank by an unfortunate chance shot, we were undoubtedly deprived of a greater victory. The presence of the enemy's submarines subsequently necessitated the action being broken off.'

"In this statement the excuse of mines is dropped. In the despatch published on March 3 the end of the action is treated by the vice admiral as follows:

"'At 11.20 I called the *Attack* alongside, shifted my flag to her at about 11.35. I proceeded at the utmost speed to rejoin the squadron, and met them at noon retiring north-northwest. I boarded and hoisted my flag in *Princess Royal* at about 12.20, when Captain Brock acquainted me with what had occurred since *Lion* fell out of line, namely, that *Bluecher* had sunk, and that the enemy battle cruisers had continued their course to eastward in a considerably damaged condition.'

"Here observe no mention was made of submarines necessitating the action being broken off, or of an area being reached where dangers from submarines and mines prevented further pursuit. The whole incident is passed by the vice admiral without comment, unless indeed the phrase about the accident to the *Lion*, in the telegraphic report, is a comment. Did the vice admiral imply that had he remained in command he would have seen to it that his specific orders—*viz.*, that *Indomitable* should settle *Bluecher* and the other ships pursue the battle cruisers—were carried out?

"A very unfortunate situation resulted from these reticences and contradictions. Naval writers in America were naturally enough amazed by the statement attributed to Admiral Beatty in the telegraphic report, for, if the presence of submarines could stop pursuit, could not submarines drive the British Fleet off the sea? These authors naturally expressed extreme astonishment that an admiral capable of breaking off action in these conditions, and publicly acknowledging so egregious a blunder, was not at once brought to court martial. No one in his senses could have supposed that Sir David Beatty, who dealt with submarines without the least concern in the affair of Heligoland and earlier in the day, on January 28, could possibly have accepted the dictum that the presence of a German submarine would justify pursuit having been broken off. It was then quite

evident that the quotation from the vice admiral's telegraphic report could not have represented the vice admiral's opinion on a point of warlike doctrine. What the actual facts of the case were, we do not to this day know. Rear Admiral Moore did not continue long in Sir David Beatty's squadron after this, but there was no court martial nor any public expression of the Admiralty's opinion by way of approval or disapproval of his proceedings. In a speech made a month after the action in the House of Commons, Mr. Churchill passed over the fact that the action had not been fought out, as if such a thing was of no exceptional importance or interest whatever. Soon afterward it became known that the rear admiral in question had got another and very important command elsewhere, so that it became plain that his conduct had not met with their lordships' reprobation."

CHAPTERS XIX–XXIV. THE BATTLE OF JUTLAND

Mr. Pollen's account of this battle is the most detailed that has thus far been issued. While some parts of the action are rather hastily passed over, the account is accurate and the comments careful and fair. As regards the deployment of the Grand Fleet, Mr. Pollen's account is apparently much more accurate than the account in the *New York Tribune* of March 9, 1919, which is supposed to be taken from Admiral Jellicoe's book. In this account the sketch shows that at 6.45 there was a distance of 5000 yards between the leading battleship and the rear battle cruiser. This does not coincide with Admiral Beatty's statement that the battle cruisers succeeded in clearing the leading battle squadron only at 6.50. Admiral Beatty also states that at this time the leading battle squadron bore north-northwest, distant three miles from *Lion* (third ship in column). In the sketch of Admiral Jellicoe, at 6.45 the distance was already three and two-third miles and the bearing 305 degrees, a difference of 33 degrees. This point is an extremely important one, as Admiral Jellicoe is apparently trying to show that there was no interference between the battle squadrons and the battle cruisers, which interference is absolutely proved by Admiral Beatty's official report.

Mr. Pollen makes the following comment upon the escape of the German Fleet:

"If the despatch tells us all that was done, one is rather driven to the conclusion that the commander-in-chief assumed that it was not our business, but the Germans' business to resume the action. Why else should he say that 'the enemy made no sign,' or exult in the fact that he knew from his Zeppelin at four o'clock where the British Fleet was if he liked to look for it? Why should the enemy make a sign? Was it not obvious after the events of the preceding day that he could have but one idea and that was safety? Scheer and Von Hipper had certainly done enough for honor. They had inflicted heavier losses than they had suffered. If they could get home they had anything but a discreditable story to tell. If the commander-in-chief really thought it was not his first duty to find and bring the enemy to action again; if the risk of approaching the Jutland coast seemed too great; if the frustration of any ulterior object the enemy might have contemplated the day before seemed cheaply purchased by the

losses the battle-cruiser fleet had suffered, so long as our main strength at sea was not impaired, then the proceedings on June 1, as communicated to us, are perfectly intelligible.

"Yet there must have been many among his officers and under his command who took a diametrically different view. After engaging for the last time at 8.40 on the previous evening, Sir David Beatty says: 'In view of the gathering darkness, and of the fact that our strategical position was such as to make it appear certain that we should locate the enemy at daylight under most favorable circumstances, I did not consider it desirable or proper to close the enemy battle fleet during the dark hours. I therefore concluded that I should be carrying out your wishes by turning to the course of the fleet, reporting to you that I had done so.'

"On the events of June 1, Sir David Beatty's despatch is silent, but it is obvious that it was not his opinion overnight that the morrow should be spent in waiting for the enemy to give a sign, but that, on the contrary, it was certain that he could and should be found and brought to action."

CHAPTER XXV. ZEEBRÜGGE AND OSTEND

The account of these two operations, the most brilliant of the entire war, is admirable.

GENERAL REMARKS

Mr. Pollen has undoubtedly written the best book on the war which has thus far been published. The actions are described in considerable detail. The comments are reasonable and fair. Of course a few may be open to discussion. The exposition of the policy of the British Admiralty is excellent. His excellent articles written throughout the war apparently did much to bring about the great changes in the Admiralty organization. The British Navy at the end of the war was certainly in a most efficient condition, better than it was at any time during the previous four years of fighting. "The British Navy in Battle" is a book which every naval officer can read with profit.

H. H. F.

NOTICE TO MEMBERS

NOTICE TO MEMBERS

More members, both regular and associate, are much desired. Any increase in membership invariably means larger number of papers and essays submitted, and consequently an improvement in the PROCEEDINGS.

You are requested to send or give the attached slip to some one eligible for membership, urging him to join.

By direction of the Board of Control,

G. M. RAVENSCROFT,
Secretary-Treasurer.

Attention is invited to extracts from the constitution on the opposite page as to the requirements in making applications for life, regular and associate membership. Members and associate members are liable for the payment of the annual dues until the date of the receipt of their resignation in writing. Annual dues $2.50.

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To the Secretary and Treasurer,
U. S. Naval Institute,
Annapolis, Md.

Dear Sir:

Please enroll my name as a { *regular* / *associate* } *member of the U. S. Naval Institute from this date.*

Very truly yours,

.....

.....

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its forty-sixth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected, they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election, and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be two dollars and fifty cents, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be forty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly; subscription for non-members, $3.00; enlisted men, U. S. Navy, $2.50. Single copies, by purchase, 30 cents; issues preceding January, 1919, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1920

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best original essay on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the essay.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All original essays published in the PROCEEDINGS during 1919, which are deemed by the Board of Control to be of sufficient merit, will be passed upon by the Board during the month of January, 1920, and the award for the prize will be made by the Board of Control, voting by ballot.

2. No essay received after November 1 will be available for publication in 1919. Essays received subsequent to November 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best essay published during 1919 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. It is requested that all essays be submitted typewritten and in duplicate; essays submitted written in longhand and in single copy will, however, receive equal consideration.

6. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

G. M. RAVENSCROFT,
Commander, U. S. N., Secretary and Treasurer.

TOPICS FOR ESSAYS

SUGGESTED BY REQUEST OF THE BOARD OF CONTROL

"Duties and Responsibilities of Subordinates with Special Reference to the Relations between Commanders-in-Chief and Chief of Naval Operations; Commanders-in-Chief and Force Commanders; Force Commanders and Division Commanders."

"Initiative of the Subordinate—Its True Meaning."

"Military Efficiency Dependent upon National Discipline."

"Governmental Organization for War."

"Naval Gunnery, Now and of the Future."

"Naval Policies."

"The Place of the Naval Officer in International Affairs."

"Moral Preparedness."

"Tact in Relation to Discipline."

"The Principles of Naval Administration in Support of War-Time Operations."

"Responsibilities and Duties of Naval and Military Officers of the United States in Educating and Informing the Public on Professional Matters."

"A Commission in The Navy: Its Meaning and the Obligations Which It Involves."

"The Relations of an Officer to his Subordinate, Both Commissioned and Enlisted."

"The True Meaning of the Expression 'An Officer and a Gentleman.'"

"Seen in the Light of Recent Events, What Should Be the United States Navy of the Future as Regards Types and Numbers of Ships."

"Probable Future Development of Surface-craft, Air-craft and Submarines and the Relation of these Types to Each Other and to Naval Warfare in General."

"The Grand Strategy of the Great War, with Especial Reference to Coördination, and Lack of Coördination, Between Naval and Military Forces."

"The Problem of Overseas Operations in the Light of Recent Developments."

"The Influence of Sea Power upon History as Illustrated by the Great War."

LIST OF PRIZE ESSAYS

"WHAT THE NAVY HAS BEEN THINKING ABOUT"

1879

Naval Education. Prize Essay, 1879. By Lieut. Commander A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut. Commander C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser Best Suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of Its Decline and the Means to Be Taken for Its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut. Commander F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How May the Sphere of Usefulness of Naval Officers Be Extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CULIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886

What Changes in Organization and Drill Are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887

The Naval Brigade: Its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888

Torpedoes. Prize Essay, 1888. By Lieut. Commander W. W. Reisinger, U. S. N.

1891

The Enlistment, Training and Organization of Crews for Our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892

Torpedo-boats: Their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894

The U. S. S. Vesuvius, with Special Reference to Her Pneumatic Battery. Prize Essay, 1894. By Lieut. Commander Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut. Commander Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention 1896. By Lieutenant John M. Ellicott, U. S. N.

1897

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant J. M. Ellicott, U. S. N.

1898

Esprit de Corps: A Tract for the Times. Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.

OUR NAVAL POWER. Honorable Mention, 1898. By Lieut. Commander Richard Wainwright, U. S. N.

TARGET PRACTICE AND THE TRAINING OF GUN CAPTAINS. Honorable Mention, 1898. By Ensign R. H. Jackson, U. S. N.

1900

Torpedo Craft: Types and Employment. Prize Essay, 1900. By Lieutenant R. H. Jackson, U. S. N.

THE AUTOMOBILE TORPEDO AND ITS USES. Honorable Mention, 1900. By Lieutenant L. H. Chandler, U. S. N.

1901

Naval Administration and Organization. Prize Essay, 1901. By Lieutenant John Hood, U. S. N.

1903

Gunnery in Our Navy. The Causes of Its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.

A NAVAL TRAINING POLICY AND SYSTEM. Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.

SYSTEMATIC TRAINING OF THE ENLISTED PERSONNEL OF THE NAVY. Honorable Mention, 1903. By Lieutenant C. L. Hussey, U. S. N.

OUR TORPEDO-BOAT FLOTILLA. The Training Needed to Insure Its Efficiency. Honorable Mention, 1903. By Lieutenant E. L. Beach, U. S. N.

1904

The Fleet and Its Personnel. Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.

A PLEA FOR A HIGHER PHYSICAL, MORAL AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY. Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905

American Naval Policy. Prize, Essay 1905. By Commander Bradley A. Fiske, U. S. N.

THE DEPARTMENT OF THE NAVY. Honorable Mention, 1905. By Rear Admiral Stephen B. Luce, U. S. N.

1906

Promotion by Selection. Prize Essay, 1906. By Commander Hawley O. Rittenhouse, U. S. N.

THE ELEMENTS OF FLEET TACTICS. First Honorable Mention, 1906. By Lieut. Commander A. P. Niblack, U. S. N.

GLEANINGS FROM THE SEA OF JAPAN. Second Honorable Mention, 1906. By Captain Seaton Schroeder, U. S. N.

THE PURCHASE SYSTEM OF THE NAVY. Third Honorable Mention, 1906. By Pay Inspector J. A. Mudd. U. S. N.

1907

Storekeeping at the Navy Yards. Prize Essay, 1907. By Pay Inspector John A. Mudd, U. S. N.

BATTLE REHEARSALS. A Few Thoughts on Our Next Step in Fleet-Gunnery. First Honorable Mention, 1907. By Lieut. Commander Yates Stirling, U. S. N.

THE NAVAL PROFESSION. Second Honorable Mention, 1907. By Commander Bradley A. Fiske, U. S. N.

1908

A Few Hints to the Study of Naval Tactics. Prize Essay, 1908. By Lieutenant W. S. Pye, U. S. N.

THE MONEY FOR THE NAVY. First Honorable Mention, 1908. By Pay Inspector John A. Mudd, U. S. N.

THE NATION'S DEFENCE—THE OFFENSIVE FLEET. How Shall We Prepare It for Battle? Second Honorable Mention, 1908. By Lieut. Commander Yates Stirling, U. S. N.

1909

Some Ideas about Organization on Board Ship. Prize Essay, 1909. By Lieutenant Ernest J. King, U. S. N.

THE NAVY AND COAST DEFENCE. Honorable Mention, 1909. By Commodore W. H. Beehler, U. S. N.

THE REORGANIZATION OF THE NAVAL ESTABLISHMENT. Honorable Mention, 1909. By Pay Inspector J. A. Mudd, U. S. N.

A PLEA FOR PHYSICAL TRAINING IN THE NAVY. Honorable Mention, 1909. By Commander A. P. Niblack, U. S. N.

1910

The Merchant Marine and the Navy. Prize Essay, 1910. By Naval Constructor T. G. Roberts, U. S. N.

THE NAVAL STRATEGY OF THE RUSSO-JAPANESE WAR. Honorable Mention, 1910. By Lieutenant Lyman A. Cotton, U. S. N.

1911

Navy Yard Economy. Prize Essay, 1911. By Paymaster Charles Conard, U. S. N.

NAVAL POWER. Honorable Mention, 1911. By Captain Bradley A. Fiske, U. S. N.

WANTED—FIRST AID. Honorable Mention, 1911. By Commander C. C. Marsh, U. S. N.

1912

Naval Might. Prize Essay, 1912. By Lieutenant Ridgely Hunt, U. S. N. (retired).

INSPECTION DUTY AT THE NAVY YARDS. Honorable Mention, 1912. By Lieut. Commander T. D. Parker, U. S. N.

1913

The Greatest Need of the Atlantic Fleet. Prize Essay, 1913. By Lieut. Commander Harry E. Yarnell, U. S. N.

NAVY DEPARTMENT ORGANIZATION. A Study of Principles. First Honorable Mention, 1913. By Commander Yates Stirling, Jr., U. S. N.

TRAINED INITIATIVE AND UNITY OF ACTION. Second Honorable Mention, 1913. By Lieut. Commander Dudley W. Knox, U. S. N.

NERAL LIBRA

1914

The Great Lesson from Nelson for To-day. Prize Essay, 1914. By Lieut. Commander Dudley W. Knox, U. S. N.

NAVAL POLICY AS IT RELATES TO THE SHORE ESTABLISHMENT AND THE MAINTENANCE OF THE FLEET. Honorable Mention, 1914. By Captain John Hood, U. S. N.

OLD PRINCIPLES AND MODERN APPLICATIONS. Honorable Mention, 1914. By Lieut. Commander Dudley W. Knox, U. S. N.

MILITARY PREPAREDNESS. Honorable Mention, 1914. By Naval Constructor Richard D. Gatewood, U. S. N.

1915

The Rôle of Doctrine in Naval Warfare. Prize Essay, 1915. By Lieut. Commander Dudley W. Knox, U. S. N.

AN AIR FLEET: OUR PRESSING NAVAL WANT. First Honorable Mention, 1915. By Lieut. Commander Thomas Drayton Parker, U. S. N.

TACTICS. Second Honorable Mention, 1915. By Ensign H. H. Frost, U. S. N.

DEFENCE AGAINST SURPRISE TORPEDO ATTACK. Third Honorable Mention, 1915. By Ensign R. T. Merrill, 2d, U. S. N.

1916

The Moral Factor in War. Prize Essay, 1916. By Lieutenant (J. G.) H. H. Frost, U. S. N.

NAVAL PERSONNEL. First Honorable Mention, 1916. By Lieut. Commander J. K. Taussig, U. S. N.

EDUCATION AT THE U. S. NAVAL ACADEMY. Second Honorable Mention, 1916. By Lieutenant Ridgely Hunt, U. S. N.

SOME UNDERLYING PRINCIPLES OF MORALE. Third Honorable Mention, 1916. By Commander Dudley W. Knox, U. S. N.

LARGE *vs.* A GREATER NUMBER OF SMALLER BATTLESHIPS. Lippincott Prize Essay. By Lieut. Commander Thomas Lee Johnson, U. S. N.

1917

Commerce Destroying in War. Prize Essay, 1917. By Commander Lyman A. Cotten, U. S. Navy.

THE PEOPLE'S RÔLE IN WAR. First Honorable Mention, 1917. By Lieutenant H. H. Frost, U. S. Navy.

THE NATION'S GREATEST NEED. Second Honorable Mention, 1917. By Colonel Dion Williams, U. S. Marine Corps.

1918

Letters on Naval Tactics. Prize Essay, 1918. By Lieutenant H. H. Frost, U. S. N.

THE PREPAREDNESS OF THE FUTURE. First Honorable mention, 1918. By Commander H. O. Rittenhouse, U. S. N. Retired.

NAVAL STRATEGY. Second Honorable Mention, 1918. By Rear Admiral Bradley A. Fiske, U. S. N.

1919

MILITARY CHARACTER. First Honorable Mention, 1918. By Captain Reginald R. Belknap, U. S. N.

SOME REFLECTIONS ON THE THREE FACTORS OF BATTLESHIP DESIGN. Second Honorable Mention, 1918. By Lieut. Commander Beirne S. Bullard, C. C., U. S. N.